

THE SPIDER GENUS *DYSDERA* (ARANEAE, DYSDERIDAE) IN CENTRAL EUROPE: REVISION AND NATURAL HISTORY

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ABSTRACT. Nine species of the genus *Dysdera* were found to occur in central Europe: *D. adriatica* Kulczyński 1897, *D. crocata* Koch 1838, *D. dubrovinnii* Deeleman-Reinhold 1988, *D. erythrina* (Walckenaer 1802), *D. ninnii* Canestrini 1868, *D. hungarica* Kulczyński 1897, *D. lantosquensis* Simon 1882, *D. longirostris* Doblika 1853, and *D. taurica* Charitonov 1956. Two species, *D. dubrovinnii* and *D. lantosquensis*, are newly recorded from central Europe. The original description of *D. hombergi* (Scopoli 1763), the name used for a common species of the genus *Harpactea*, probably refers to *D. ninnii*. We retain the name *D. ninnii* as a *nomen protectum*. *Dysdera hamulata* Kulczyński 1897 appears to be a junior synonym of *D. maurusia* Thorell 1873. This North African species probably does not occur in central Europe, and a previous record from Slovakia is probably based on mislabeled material. A review of all species of *Dysdera* named from outside the Palearctic region demonstrated that *D. australiensis* Rainbow 1900 and *D. magna* Keyserling 1877 are junior synonyms of *D. crocata*, and that *D. bicolor* Tatzanovski 1874 and *D. solers* Walckenaer 1837 are erroneously placed in the genus *Dysdera*; the former is likely to be an oonopid and the latter a caponiid. In central Europe, *Dysdera* spiders prefer xerothermic forests, particularly sites enriched by calcium. All species probably have biennial life-cycles. The karyotype of males of seven species were examined, and diploid chromosome numbers were found to be extraordinarily variable, ranging from 9 (*D. crocata*) to 40 (*D. longirostris*). Karyotypes consist of holocentric chromosomes.

Keywords: Sibling species, karyotype, geographic parthenogenesis, taxonomy, thelytoky

Spiders of the genus *Dysdera* (Dysderidae) are ground dwellers characteristic of xerothermic forests of the Mediterranean and adjacent areas. During the day, they shelter in gravel covered by organic material or under stones, and at night they search for woodlice, their principal prey (Cooke 1965).

Comprising more than 240 species (Platnick 2007), *Dysdera* is currently the largest genus in the family Dysderidae and one of the richest Palearctic spider genera. Interestingly, the vast majority of species appear to be endemic to only small areas of the Mediterranean region, and only nine representatives appear to have colonized central Europe after the last glacial period. Although the species diversity in this region is low, there has been much confusion concerning their identification because of the uniformity in both the shape and body color, similarity in external female genitalic features

and the presence of sibling species (e.g., Deeleman-Reinhold & Deeleman 1988).

A modern revision of the genus was initiated by Deeleman-Reinhold & Deeleman (1988), focusing on species from the eastern part of the Mediterranean. The genus was redefined and divided into different species-groups. This paper revises central European species of the genus *Dysdera*, based mainly on analysis of material from the Czech Republic and Slovakia. We solve some nomenclatural problems and summarize data on the distribution, habitat preferences, phenology and karyotypes of the species. We recognize eight species representing five groups within central Europe: *D. crocata* C.L. Koch 1838 (*crocata* group); *D. ninnii* Canestrini 1868, *D. dubrovinnii* Deeleman-Reinhold 1988 (*ninnii* group); *D. hungarica* Kulczyński 1897, *D. adriatica* Kulczyński 1897, *D. longirostris* Doblika 1853 (*longirostris*

group); *D. taurica* Charitonov 1956 (*lata* group); *D. erythrina* (Walckenaer 1802) and *D. lantosquensis* Simon 1882 (*erythrina* group).

MATERIAL AND METHODS

Distributional data and habitat preferences were obtained by analysis of extensive material from collections and during our field work. Selected localities were visited mainly in the summers of 1999–2005. Vegetation of inspected localities was characterized following Chytrý et al. (2001) and Moravec (1995).

Specimens were examined using a Nikon SMZ 645 stereomicroscope and an Olympus BX51 light microscope. Before examination, female vulvae were dissected and cleared in glycerol. The prosoma, chelicerae and bulbi of selected males were removed, placed on a stub, coated with gold and examined using a scanning electron microscope JEOL JSM 6400. To describe structures of the male pedipalp and the female vulva, we used the terminology of Arnedo et al. (2000).

Phenology was studied both on selected localities and by processing data on labels of the revised material. Phenological observations were performed on data from the following localities: Rokštejn [49°19'N, 15°43'E], Czech Republic (*D. ninnii*); Vinné near Michalovce [48°48'N, 21°58'E], Slovakia (*D. dubrovninnii*); Hrušov [48°36'N, 20°40'E] and Vinné near Michalovce, Slovakia (*D. hungarica*); Plitvička jezera [44°54'N, 15°36'E], Croatia (*D. adriatica*); Rílski monastir [42°07'N, 23°20'E] and Kranevo [43°20'N, 28°02'E], Bulgaria (*D. longirostris*); and Kranevo, Bulgaria (*D. taurica*).

For the karyological analyses, the most appropriate ontogenetic stage was found to be the adult male shortly after molting, which occurs at the end of the summer in all species studied. Testes at this stage contained numerous dividing cells suitable for karyotypic analysis, namely spermatogonial mitoses as well as various meiotic stages. The chromosome preparations were obtained by the method described in Pekár & Král (2001). Localities of karyotyped species were as follows: *D. crocata* – Kranevo near Varna, Bulgaria, 1 ♂; Çaytepe near Ordu, Turkey, 1 ♂; Mitra near Évora, Portugal, 4 ♂; Bloemfontein, South Africa, 1 ♂; Taborno, Tenerife, Spain, 2 ♂; *D. ninnii* – Rokštejn near Brtnice, Czech Republic, 2 ♂; *D. dubrovninnii* – Vinné near Michalovce, Slovakia, 2 ♂; *D. hungarica* – Hradisko near

Hrušov, Slovakia, 2 ♂; *D. adriatica* – Korana near Plitvička jezera, Croatia, 1 ♂; *D. longirostris* – Kranevo near Varna, Bulgaria, 4 ♂; and *D. taurica* – Kranevo near Varna, Bulgaria, 2 ♂. Chromosome preparations were examined under immersion lens using an Olympus BX 50 light microscope.

Specimens are lodged in the following institutions: private collection of Aleš Jelínek, Telč, Czech Republic (AJ); Australian Museum, Sydney, Australia (AMS); Museum of Natural History, London, UK (BMNH); private collection of F. Gasparo, Trieste, Italy (FG); Magyar Természettudományi Múzeum, Budapest, Hungary (HNHM); private collection of J. Dolanský, Pardubice, Czech Republic (JD); private collection of J. Svatoň, Martin, Slovakia (JS); private collection of L. Kubcová, Prague, Czech Republic (LK); private collection of M. Antuš, Prague, Czech Republic (MA); Muséum d'Histoire Naturelle, Genève, Switzerland (MHNG); Muséum National d'Histoire Naturelle, Paris, France (MNHN); private collection of M. Řezáč, Prague, Czech Republic (MR); Naturhistoriska Riksmuseet, Stockholm, Sweden (NHRS); Národní Muzeum, Prague, Czech Republic (NMPC); Naturhistorisches Museum, Vienna, Austria (NMW); private collection of P. Gajdoš, Nitra, Slovakia (PG); South Australian Museum, Adelaide, Australia (SAM); Naturmuseum Senckenberg, Frankfurt am Main, Germany (SMF); Univerza v Ljubljani, Slovenia (UL); Universidad de La Laguna, Spain (ULCI); private collection of V. Bryja, Brno, Czech Republic (VB); private collection of V. Hula, Brno, Czech Republic (VH); Vihorlatské múzeum, Humenné, Slovakia (VMH); private collection of V. Růžicka, České Budějovice, Czech Republic (VR); Western Australian Museum, Perth, Australia (WAM); private collection of Z. Majkus, Ostrava, Czech Republic (ZM); Museum für Naturkunde, Humboldt Universität, Berlin, Germany (ZMHB).

TAXONOMY

Family Dysderidae C.L. Koch 1837

Genus *Dysdera* Latreille 1804

Type species.—*Dysdera erythrina* (Walckenaer 1802).

Remarks.—Comprising more than 240 named species (Platnick 2007), *Dysdera* is currently the largest genus in the family

Dysderidae. The vast majority of species appear to be endemic to the Mediterranean region; only nine representatives appear to have colonized central Europe.

KEY TO THE SPECIES OF CENTRAL EUROPEAN *DYSDERA*

1. Carapace smooth with rounded pits 2 (*ninnii* group)
Carapace wrinkled, without rounded pits 3
2. Cheliceral fang not flattened *Dysdera ninnii*
Cheliceral fang dorsoventrally flattened *Dysdera dubrovninnii*
3. Tibiae III and IV with one or more dorsal spines *Dysdera taurica* (*lata* group)
Tibiae III and IV without dorsal spines 4
4. Femur IV with one or more dorsal spines *Dysdera crocata* (*crocata* group)
Femur IV without dorsal spines 5
5. Lateral anterior margins of carapace parallel (dorsal view), inner margin of basal cheliceral segment concave 6 (*erythrina* group)
Lateral anterior margins of carapace convergent (dorsal view), inner margin of basal cheliceral segment straight 7 (*longirostris* group)
6. Mediodorsal margin of basal cheliceral segment concave, covered by short bristles; length of cheliceral fang/length of carapace more than 0.45; ventral side of tibia IV usually with three spines *Dysdera lantosquensis*
Mediodorsal margin of basal cheliceral segment convex, covered by normal hairs; length of cheliceral fang/length of carapace less than 0.45; ventral side of tibia IV usually with four spines *Dysdera erythrina*
7. Ratio of the length of cheliceral fang and the length of carapace approximately 0.75 *Dysdera longirostris*
Ratio of the length of cheliceral fang and the length of carapace approximately 0.5 8
8. Male: bulbus with relatively parallel finger-like lateral sheet apophysis (Figs. 28, 29). Female: paired chitinized bands on the ventral wall of the copulatory bursa large and parallel (Fig. 30) *Dysdera hungarica*
Male: bulbus with relatively protruding finger-like lateral sheet apophysis (Figs. 32, 33). Female: paired chitinized bands on the ventral wall of the copulatory bursa narrow and anteriorly convergent (Fig. 34) *Dysdera adriatica*

Dysdera crocata species-group

Remarks.—This species-group was first recognized by Deeleman-Reinhold (1988). Only one species of the group, *D. crocata* Koch 1838, has been found in central Europe. The other species, *D. hamulata* Kulczyński 1897 described from Slovakia (a junior synonym of *D. maurusia* Thorell 1873) probably does not occur in central Europe.

Dysdera crocata C.L. Koch 1838

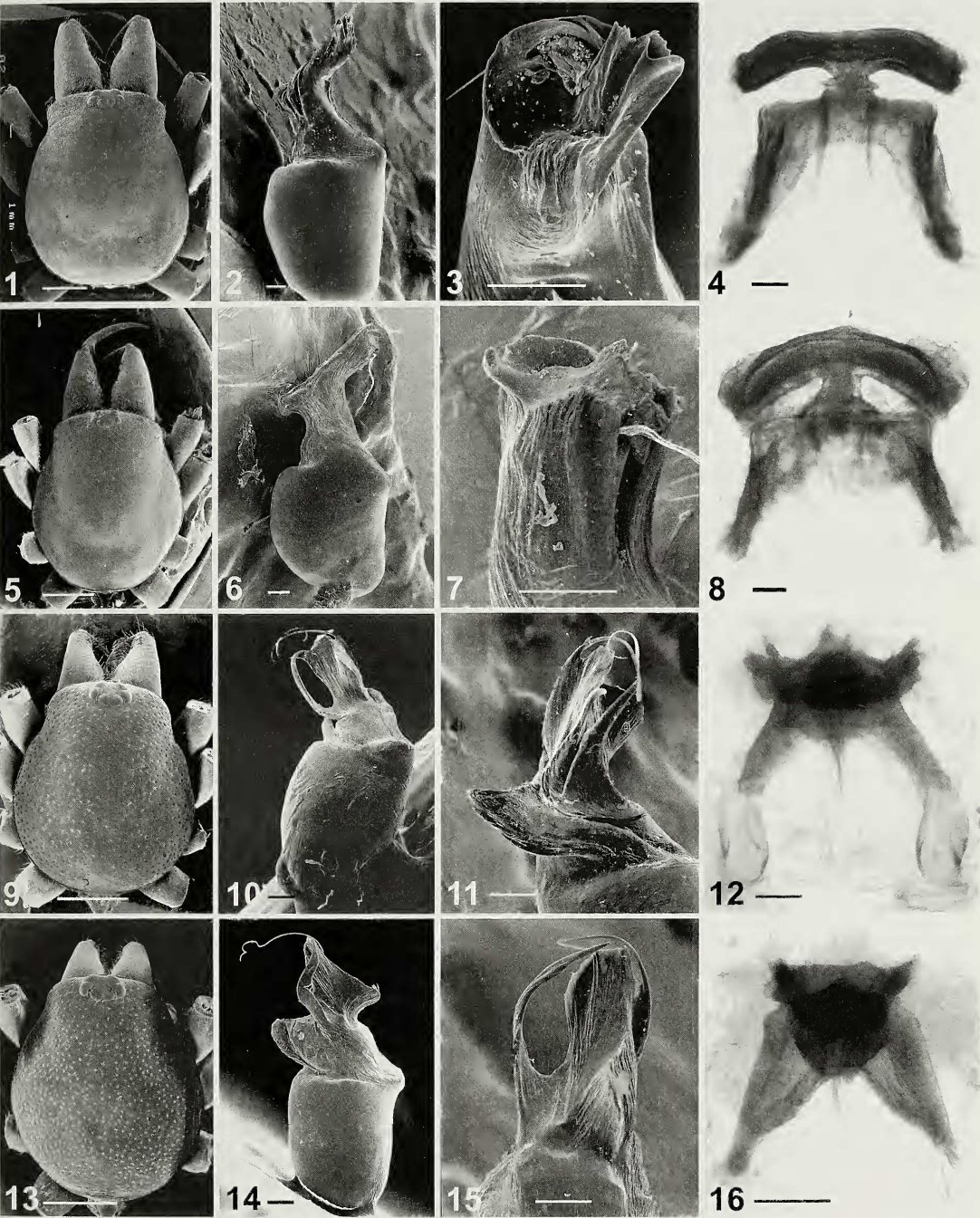
Figs. 1–4, 17

Dysdera crocata C.L. Koch 1838:81, figs. 392–394; Doblika 1853:119; Becker 1896:316, plate 17, fig. 21; Chyzer & Kulczyński 1897:268, plate 10, fig. 41; Bösenberg & Strand 1906:118, plate 16, fig. 445; Simon 1910:320, fig. 9K; Simon 1914:95, 111; Kaston 1948:62, figs. 7–10; Locket & Millidge 1951:84, figs. 41A, 42B–C, E; Wiehle 1953:19, figs. 44–48; Charitonov 1956:24, fig. 8; Grasshoff 1959:217, fig. 10;

Cooke 1966:36, figs. 2, 4–6; Braendegaard 1966:71, figs. 59–61; Loksa 1969:78, figs. 54A–C; Tyschenko 1971:71, fig. 101; Cooke 1972:90, fig. 1; Dresco 1973:247, fig. 4; Roberts 1985:60, figs. 19b, d, f, h; Forster & Platnick 1985:214, figs. 831, 841, 860, 864; Yoshikura 1987:153, fig. 20.10A; Deeleman-Reinhold & Deeleman 1988:157, figs. 23–27; Heimer & Nentwig 1991:44, fig. 94; Wunderlich 1992:292, figs. 28–31; Dunin 1992:62, fig. 1; Roberts 1995:94; Wunderlich 1995:407, figs. 6–9; Dippenaar-Schoeman & Jocqué 1997:155, figs. 73e, f; Mcheidze 1997:74, figs. 61–62; Roberts 1998:97; Song et al. 1999:68, figs. 27F–I; Arnedo et al. 2000:281, figs. 35, 37; Planet 1905:61, plate 4, fig. 1 (identification doubtful).

Dysdera interrita Hentz 1842:223; Emerton 1902:22, figs. 70–72; Comstock 1940:109, fig. 99.

Dysdera gracilis Nicolet 1849:340, plate 2, fig. 5.



Figures 1–16.—Characters of central European *Dysdera* species, *Dysdera crocata* and *D. ninnii* groups. 1–4. *Dysdera crocata*, male, from Mikulov, Czech Republic; female from Nieuwpoort, Netherlands; 5–8. *D. maurusia*, male from Beni Saoud, Algeria; female from Maison Carrée, Algeria; 9–12. *D. ninnii*, male and female from Brtnice, Czech Republic; 13–16. *D. dubrovninnii*, male and female from Michalovce, Slovakia: 1, 5, 9, 13. Male prosoma, dorsal view; 2, 6, 10, 14. Bulbus; 3, 7, 11, 15. Detail of distal division of bulbus; 4, 8, 12, 16. Anterior diverticle of vulva. Scale bars = 1 mm (prosomas), 0.1 mm (bulbi, vulvae).



Figures 17–23.—Male karyotypes: 17. *Dysdera crocata*; 18. *D. ninnii*; 19. *D. dubrovinnii*; 20. *D. hungarica*; 21. *D. adriatica*; 22. *D. longirostris*; 23. *D. taurica*. Karyotypes are based on spermatogonial metaphases. The numbers indicate autosome pairs except for the unresolved karyotype of *D. longirostris*, where they indicate particular chromosomes. Scale bar = 10 μ m.

Dysdera rubicunda: Blackwall 1864a:371, plate 28, fig. 371; Menge 1872:297, plate 54, fig. 171.

Dysdera wollastoni Blackwall 1864b:179 (identification doubtful).

Dysdera balearica Thorell 1873:581 (identification doubtful).

Dysdera coerulescens Koch 1874:203 (identification doubtful).

Dysdera magna Keyserling 1877:230 [considered to be a synonym by Cooke (1967), however not accepted by Platnick (2007)].

New synonymy.

Dysdera maurusia: Dahl 1883:41.

Dysdera australiensis Rainbow 1900:485, plate 23, fig. 1 [considered to be a synonym by Cooke (1967), however not accepted by Platnick (2007)]. **New synonymy.**

Dysdera erythrina: Planet 1905:61, plate 4, fig. 2.

Dysdera sternalis Roewer 1928b:94.

Dysdera cretica Roewer 1928b:95, plate 1, fig. 1.

Dysdera menozzii Caporiacco 1937:58, fig. 1.

Dysdera palmensis Schmidt 1982:395, fig. 3.

Dysdera inaequuscapillata Wunderlich 1992:295, figs. 42–46.

Type material.—*Dysdera australiensis*: AUSTRALIA: *New South Wales*: female holotype, Sydney (33°52'S, 151°06'E) (AMS, examined).

Dysdera balearica: SPAIN: male holotype, Mallorca, Balearic Islands, F. Söderlund (repository unknown, not examined).

Dysdera coerulescens: GERMANY: syn- types: males and females, Lorsbacher near Nassau (50°23'N, 7°50'E), L. Koch, May 1871 (repository unknown, not examined); 1 specimen, same locality, O. Böttger, April 1873 (repository unknown, not examined).

Dysdera cretica: GREECE: juvenile holotype, Rethymnon (35°22'N, 24°28'E), Crete, C.F. Roewer, June 1926 (SMF, not examined).

Dysdera crocata: GREECE: syntypes: unknown number of adult specimens, Morea peninsula (37°30'N, 22°15'E), Peloponnesos, Schuh (perhaps BMNH, not examined).

Dysdera gracilis: CHILE: juvenile holotype, Santiago (33°28'S, 70°38'W) (repository unknown, not examined).

Dysdera inaequiscapillata: SPAIN: male holotype, Punta Hidalgo (28°31'N, 16°15'W), Tenerife, Canary Islands, 14 December 1986, R. Wis (ULCI, not examined). Paratypes: 1 male, 2 females, 1 juvenile, collected with holotype (ULCI, not examined); 1 female, same locality, 23 December 1986, C. Campos (ULCI, not examined); 1 male, Mercedes (28°31'N, 16°17'W), Tenerife, Canary Islands, Spain, May 1984, S. Morales (ULCI, not examined).

Dysdera interrita: USA: *Massachusetts*: syntypes: 1 male, 1 female, May, T.W. Harris (repository unknown, not examined).

Dysdera magna: BRAZIL: syntype: 1 female, Rio Grande do Sul (32°02'S, 52°06'W), (Uruguay is indicated in original description) (BMNH, examined).

Dysdera menozzii: LIBYA: syntypes: 3 males, 1 female, Tagiura (32°52'N, 13°21'E), C. Menozzio (repository unknown, not examined).

Dysdera palmensis: SPAIN: holotype female, Mazo (28°36'N, 17°45'W), La Palma, Canary Islands, G.E.W. Schidt (repository unknown, not examined).

Dysdera sternalis: GREECE: holotype female, Akrotiri, Crete, May 1926, C.F. Roewer (SMF, not examined).

Dysdera wollastoni: PORTUGAL: syntypes: 2 males, 3 females, 2 juveniles, Madeira (32°44'N, 16°59'W), T.V. Wollaston (repository unknown, not examined).

Other material examined.—ALGERIA: 1 ♂, M'sila area, Bou Saada [35°12'N, 4°10'E], (MNHN). AUSTRALIA: *Lord Howe Island* [31°33'S, 159°05'E]: 1 ♂, R. Baxter (AMS). *New South Wales*: 2 ♂, 4 ♀, Botany [33°56'S, 151°11'E], 1964–1965, 18 October 1978 (AMS); 1 ♂, 1 ♀, same location, 20 September 1966, R.E. Mascord (AMS); 1 ♂, 1 ♀, Sydney [33°52'S, 151°05'E], 22 April 1930, W.M. Pratt (AMS); 1 ♀, same location, 4 January 1955, A. Musgrave (AMS); 1 juvenile, North Sydney

[33°44'S, 151°07'E], 4 June 1944, R. Virgona (AMS); 1 ♀, Mosman [33°49'S, 151°14'E], 29 November 1947, L.S. McKern (AMS); 1 ♀, Randwick [33°55'S, 151°14'E], 4 September 1951, T. Riding (AMS); 1 ♀, Moss Vale [34°33'S, 150°22'E], 2 October 1987, (AMS); 1 ♀, Northbridge [33°48'S, 151°13'E], 29 February 1972, J. Watson (AMS); 1 ♀, Mudgee [32°36'S, 149°34'E], 21 August 1989, J. McQuiggin (AMS); 1 ♀, Chippendale [33°53'S, 151°11'E], 11 February 1994, L. Bonsheck (AMS); 1 ♂, Forbes [33°23'S, 148°00'E], 16 September 1993, M.C. Daniel (AMS); 1 ♀, Pyrmont, Darling Island [33°51'S, 151°11'E], 6 December 1933 (AMS); 1 ♂, Pyrmont [33°52'S, 151°11'E], 1 February 2001, B. Dancs (AMS); 1 ♀, Surry Hills [33°53'S, 151°12'E], August 2001 (AMS); 1 ♂, East Lindfield [33°46'S, 151°11'E], 17 July 1956, D. MacMichael (AMS); 1 ♀, Bathurst [33°25'S, 149°34'E] (AMS); 1 juvenile, Clovelly [33°55'S, 151°15'E], 24 February 1944, R. Crapp (AMS); 1 ♂, 1 ♀, Enfield [33°53'S, 151°06'E], May 1949, L. Jarrett (AMS); 1 ♀, same location (AMS); 1 ♀, Canterbury [33°54'S, 151°07'E] (AMS); 1 ♀, Carlton [33°58'S, 151°08'E], July 1928, J. McClure (AMS); 1 ♀, Waverley [33°53'S, 151°15'E], B.W. Stevens (AMS); 1 ♂, Paddington [33°53'S, 151°13'E], 8 June 1971, P. Hutchings (AMS); 1 ♀, Kirribilli [33°50'S, 151°12'E], 1 August 1974 (AMS); 2 ♀, Kyeemagh [33°57'S, 151°09'E], October 1964, W.R. Macpherson (AMS); 1 ♂, 1 ♀, Rose Bay [33°52'S, 151°16'E], August 1963, A.L. Ironside (AMS); 1 ♂, Lakemba [33°55'S, 151°04'E], E.A. Brack (AMS). *Norfolk Island* [29°01'S, 168°02'E]: 1 ♀, 20 April 1993, H. Sampson (AMS); 1 ♂, 1 ♀ (AMS); 1 ♀, December 1915–January 1916, A.M. Lea (SAM). *Queensland*: 1 ♂, 1 ♀, Molangool W. [24°45'S, 151°32'E], H.H.B. Bradley (AMS, assigned as types of *Dysdera australiensis*). *South Australia*: 1 ♂, 1 ♀, Adelaide, Marino [35°02'S, 138°30'E], 10 August 1970, R.V. Southcott (SAM); 1 ♂, Adelaide [34°55'S, 138°35'E], 18 September 1911, G. Hilbig (SAM); 1 ♀, same location, 31 March 1976, R.V. Southcott (SAM); 1 ♀, same location, 26 August 1980, Cooter (SAM); 3 ♂, 2 ♀, 3 juveniles, Adelaide, Medindee [34°55'S, 138°35'E], 24 April 1989, Huilde (SAM); 1 ♀, Adelaide, Trinity Gardens [34°55'S, 138°35'E], 28 February 1987, D. Hirst (SAM); 1 ♀, Adelaide, Payneham [34°53'S, 138°37'E], 14 August 1967, R. Briggs (SAM); 1 juvenile,

Adelaide, Windsor Gardens [34°55'S, 138°35'E], 14 September 1991, D. Hirst (SAM); 1 ♀, Adelaide, Highgate [34°55'S, 138°35'E], October 1958, H.R. Lindsay (SAM). *Tasmania*: 3 ♂, 4 ♀, 3 juveniles, New Town [42°51'S, 147°17'E], 25 March 1939, March 1953, 16 March 1961, 27 October 1963, March 1965, V.V. Hickman (AMS); 1 ♂, Risdon Rise [42°48'S, 147°21'E], 27 May 1929, V.V. Hickman (AMS); 2 ♀, Launceston [41°26'S, 147°08'E], 3 September 1929, V.V. Hickman (AMS); 2 ♂, Ulverstone [41°09'S, 146°10'E], 11 March 1992, A.F. Longbottom (WAM); 1 ♀, Davenport, the Forth river [41°10'S, 146°20'E], January 2003, M. Strnadová (MR). *Victoria*: 1 ♀, 3 juveniles, Balwyn [37°48'S, 145°05'E], 6 January 1982, 1 January 1983, M.S. Harvey (WAM); 1 ♂, 1 juvenile, Geelong [38°08'S, 144°20'E], 23 May 1978, R. Easton (WAM); 1 ♀, Melbourne, Ashburton [37°52'S, 145°04'E], 5 January 1988, P.K. Lillywhite (WAM); 2 juveniles, Wonthaggi [38°36'S, 145°35'E], 15 December 2002, M.S. Harvey (WAM); 1 ♀, Donvale [37°47'S, 145°11'E], 16 January 1983, M.B. Darby (WAM); 1 ♂, 1 juvenile, Surrey Hills [37°49'S, 145°05'E], 9 January 1982, M.S. Harvey (WAM); 1 ♀, Clayton [37°56'S, 145°08'E], 23 September 1982, B.E. Roberts (WAM). *AUSTRIA*: 1 ♀, Tyrol [47°15'N, 11°20'E] (BMNH). *BELGIUM*: 1 ♂, Nieuwpoort [51°07'N, 2°45'E], 30 April 2004, P. Saska (MR). *CROATIA*: 1 ♀, Senj (=Zeng) [44°59'N, 14°54'E], C. Chyzer (HNHM). *CZECH REPUBLIC*: 1 ♀, Prague [50°04'N, 14°26'E], 13 May 2001, Václavková (NMPC); 1 ♀, Mikulov [48°47'N, 16°37'E], 6 October 2002, J. Chytil (MR); 3 ♂, Brno, reserve Kavky [49°11'N, 16°36'E], 4 July 2005, 17 August 2005, S. Vinkler (VB). *FRANCE*: 1 ♂, Corsica [42°09'N, 9°04'E] (MNHN); 1 ♂, Banyuls [42°29'N, 3°07'E], 25 September 1962, L. Berland (MNHN); 1 ♂, Cerbère, Provence [42°26'N, 3°09'E] (BMNH). *GREECE*: 1 ♂, Leptokaria [40°03'N, 22°33'E], 4–13 June 1996, J. Dolanský (MR); 1 ♀, Chios island [38°23'N, 26°02'E], C.L. Koch (BMNH). *IRELAND*: 2 ♀, Dublin [53°20'N, 6°15'W], A.K.J. de Montmorency (BMNH). *ITALY*: 1 ♂, Naples [40°51'N, 14°16'E], Olf (ZMHB). *PORTUGAL*: 1 ♂, Algarve, Santa Bárbara de Nexe [37°06'N, 7°57'W], April 1963 (MNHN); 1 ♀, Mitra near Évora [38°33'N, 7°52'W], 1 November 2001, S. Pekár (MR). *ROMANIA*: 1 ♂,

1 ♀, Orșova [44°42'N, 22°23'E], Böckh (HNHM); 1 ♂, Costinești [43°57'N, 28°37'E], 7–8 August, Dobnlu (NMPC). ?*RUSSIA*: 1 ♂, Caucasus (MNHN, *sub D. hungarica*). *SLOVENIA*: 1 ♀, Pridvor, Sv. Anton, Dekani, Koper [45°31'N, 13°50'E], August 1995, S. Toth (UL). *SOUTH AFRICA*: 1 ♂, 1 ♀, Bloemfontein [29°06'S, 26°13'E], 5 February 2005, M. Řezáč (MR). *SPAIN*: 1 ♀, unspecified location (ZMHB). *Minorca*: many ♂, ♀, unspecified location, D. Braun (BMNH); 2 ♂, 2 ♀, Mahon [39°53'N, 4°15'E], 28 December 1958, H. Coiffait (MNHN). *Tenerife*: 1 ♂, 1 ♀, Los Cristianos [28°03'N, 16°43'W], July 1972, I. Zunino (MNHN); 1 ♂, Anaga mountains, Taborno [28°32'N, 16°14'W], 2 March 2006, M. Řezáč (MR); 1 ♂, Orotava valley, Aquamansa, La Caldera [28°20'N, 16°29'W], 7 March 2006, M. Řezáč (MR); 1 ♂, La Esperanza, Las rosas, Las Raices [28°26'N, 16°21'W], 8 March 2006, M. Řezáč (MR); 1 ♂, Labrada cave [28°27'N, 16°25'W], 17 March 2006, M. Řezáč (MR); 1 ♂, Icod de los Vinos, San Marcos [28°22'N, 16°42'W], 19 March 2006, M. Řezáč (MR). *TUNISIA*: 2 ♂, 2 ♀, unspecified location (NHRS); 2 ♀, Hammamet [36°24'N, 10°36'E], 7–20 May 1997, J. Dolanský (MR); 1 ♀, 1 juvenile, Zughonan [36°24'N, 10°08'E], 12 May 1997, J. Dolanský (MR); 1 ♂, 1 ♀, Kairanan [35°40'N, 10°05'E], April 1914 (MNHN). *UKRAINE*: *Crimea*: 2 ♂, 1 ♀, Cherson Taurica, Sevastopol [44°36'N, 33°31'E] (NHRS); 1 ♂, Yalta, Massandra Park [44°30'N, 34°11'E], 20 May–19 June 2001, N. Kovblyuk (MR); 1 ♂, Karadag, Beregovoy mountains [44°54'N, 33°36'E], 26 April 2003, N. Kovblyuk (MR). *UNITED KINGDOM*: 1 ♀, Box Hill, Surrey [51°23'N, 2°14'W], August 1989, M.R. Gray (AMS); 1 ♀, Worcestershire [52°17'N, 2°16'W] (AMS), 1 ♀, Brighton, Sussex [50°49'N, 0°08'W], 5 November 1933, A.F. Brazenor (BMNH); 1 ♀, Lewes, Sussex [50°52'N, 0°00'W], 3 May 1925, J.C. Campbell-Layor (BMNH); 1 ♀, London, Chiswick [51°29'N, 0°14'W], N.H. Bennett (BMNH); 1 ♀, Weybridge [51°22'N, 0°27'W], D.Y. Burry (BMNH); 1 ♀, London, Acton [51°30'N, 0°16'W], 8 February 1944, W.E. Woodward (BMNH). *U.S.A.*: 1 ♀, Michigan, Ann Arbor [42°16'N, 83°43'W], April 1992, A. Richards (WAM). *UZBEKISTAN*: 1 ♀, Buchara [39°46'N, 64°25'E] (ZMHB).

Diagnosis.—This species is very similar to some species of the *crocata* group, which are

restricted to the southern part of Mediterranean region, mainly northern Africa, and require further taxonomic study. Among central European species it belongs to the largest one; it is characteristic by femur IV with one or more dorsal spines and by remarkably parallel lateral margins of cephalic part of carapace; the males are characteristic by inflexed distal division of the bulbus; the females are characteristic by proximally situated, wide, equally incurved spermatheca and by endogynal ventral arch with remarkable shoulders.

Description.—*Carapace* (Fig. 1): carapace 4.2–4.9 mm long, slightly wrinkled, ferruginous to orange, dorsoventrally flat. Lateral margins of cephalic part parallel. *Chelicerae* (Fig. 1): basal segment elongated (basal segment length/carapace length = 0.53), dorsally convex, slightly wrinkled, covered with piligerous granulations. Groove elongated (length of groove/basal segment length = 0.61), equipped with three small teeth in basal half. Basal cheliceral tooth > median cheliceral tooth > distal cheliceral tooth. Median cheliceral tooth close to basal cheliceral tooth. Fang elongated (fang length/carapace length = 0.51), thorn-shaped. *Legs*: femora I–III spineless, femora IV usually with 1–3 dorsal spines. Tibiae III–IV dorsally spineless, ventrally with a pair of apical spines and usually with 1–2 additional spines. *Bulbus* (Figs. 2, 3): distal division narrower than tegulum, incurved, with pronounced posterior apophysis on flexion. Posterior apophysis not fused to tegulum. Arch-like ridge on apical part of bulbus without any apophysis. *Vulva* (Fig. 4): spermatheca proximally situated, wide, equally incurved. Dorsal arch rectangular. Neck connecting spermatheca with ventral wall of copulatory bursa with prominent frill in retroventral view. For detailed description see Deeleman-Reinhold & Deeleman (1988).

Remarks.—This species has been described several times under different names from various parts of the world. Cooke (1967) suggested that *Dysdera magna* Keyserling 1877, described from Brazil and reported also from Uruguay (Díaz & Sáez 1966) and *D. australiensis* Rainbow 1900 from Australia, are both junior synonyms of *D. crocata*. However, this synonymy was not definitive and not accepted [see Platnick (2007)]. We checked the genital morphology of the type specimens of these two species and found them to be morphologically identical with *D. crocata*.

Furthermore, after examination of the relevant collections from Australian museums, we were unable to locate any species other than *D. crocata*. Díaz & Sáez (1966) reported a different chromosome number ($2n \delta = 9$) from a population from Uruguay identified as *D. magna*. This population might represent a cryptic species introduced to South America together with *D. crocata*. The synonymies of *D. balearica* Thorell 1873 and *D. coerulescens* Koch 1874 with *D. crocata* are based on the conjectures published by Simon (1914). Even though they have never been accurately argued they are currently accepted (Platnick 2007). Both species were described after comparison with true *D. crocata* (Thorell 1873; Koch 1874). Unfortunately the deposition of the type material of these two species, necessary for conclusive confirmation or rejection of synonymy, is unknown. A female identified as *D. crocata* illustrated in Planet (1905) resembles *D. longirostris* due to the remarkably elongate chelicerae.

Karyotype.—Analysis of male meiotic division indicated the sex chromosome system XO in all specimens. Remarkable variation was found in the number of autosomal pairs. Males from Bulgaria and South Africa exhibited four, those from Turkey five, and those from the Canary Islands and Portugal six autosomal pairs (Fig. 17).

Habitat.—In central Europe *D. crocata* occurs only in relatively dry, synanthropic, or semisynanthropic and adjacent habitats.

Distribution.—This species has been found on all continents except for Antarctica. In central Europe, its distribution is usually limited to urban areas. This species is new for the Czech Republic. Maps of occurrence in other European countries can be found in Deltchev et al. (2003: map 15) (Serbia), Ribera et al. (1989: fig. 1) (Spain), Romano & Ferrández (1983: map 4) (Spain, province Navarra), Gajdoš et al. (1999: map 150) (Slovakia, partly based on misidentifications).

Dysdera maurusia Thorell 1873 status revised
Figs. 5–8

Dysdera maurusia Thorell 1873:467.

Dysdera crocata var. *hamulata* Kulczyński, in Chyzer & Kulczyński 1897:268, plate 10, fig.

41. **New synonymy.**

Dysdera hamulata: Simon 1914:112.

Dysdera crocata: Drensky 1938:92, fig. 8a.

? *Dysdera hamulata*: Deeleman-Reinhold & Deeleman 1988:160, fig. 23a, 24a. (misidentification).

Type specimens.—*Dysdera maurusia*: ALGERIA: syntypes: 1 male, 2 females, Alger, El Harrach (= Maison Carrée) (36°42'N, 3°07'E), H.A. Eurén (NHRS, examined).

Dysdera hamulata: SLOVAKIA: male holotype, Vranov nad Topľou (48°53'N, 21°41'E) (locality possibly in error, see below) (repository unknown, not examined).

Other material examined.—ALGERIA: 3 ♂, M'sila area, Bou Saada [35°12'N, 4°10'E] (MNHN); 1 ♂, unspecified location (MNHN); 1 ♂, Alger area, Kouba, Ravin de la Femme Sauvage [36°43'N, 3°04'E], December 1892, P. Lesne (MNHN); 1 ♂, Tlemcen [34°53'N, 1°18'W] (MNHN). USA: New York: 1 ♂, Poughkeepsie [41°42'N, 73°54'W], N. Banks (MNHN) (probably mislabeled, see below).

Diagnosis.—In contrast to the otherwise similar *D. crocata*, this species is smaller and the lateral margins of the cephalic part of carapace are not distinctly parallel; in males the arch-like ridge on the apical part of bulbus is elongated to a hook-shaped apophysis; in females the neck connecting the spermatheca with the ventral wall of the copulatory bursa is without a frill.

Description.—*Carapace* (Fig. 5): carapace 2.3–4.0 mm long, slightly wrinkled, ferruginous to orange, dorsoventrally flat. Lateral margins of cephalic part are slightly convergent. *Chelicerae* (Fig. 5): basal segment elongated (basal segment length/carapace length = 0.55), dorsally convex, slightly wrinkled, covered with piligerous granulations. Groove elongated (length of groove/basal segment length = 0.61), equipped with three small teeth in basal half. Basal cheliceral tooth > median cheliceral tooth > distal cheliceral tooth. Median cheliceral tooth close to basal cheliceral tooth. Fangs elongated (fang length/carapace length = 0.50), thorn-shaped. *Legs*: femora I–II spineless, femora III sometimes with 1, femora IV usually with 2–5 dorsal spines. Tibiae III–IV dorsally spineless, ventrally with a pair of apical spines and usually with 1–2 additional spines. *Bulbus* (Figs. 6, 7): distal division narrower than tegulum, incurved, with pronounced posterior apophysis on its flexion. Posterior apophysis not fused to tegulum. Arch-like ridge in apical part of bulbus elongated to hook-shaped

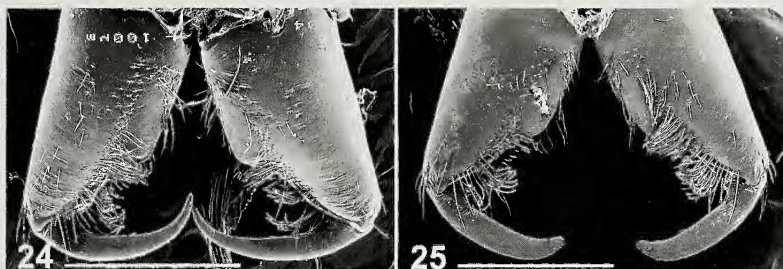
apophysis. *Vulva* (Fig. 8): spermatheca proximally situated, wide, equally incurved. Dorsal arch rectangular. Neck connecting spermatheca with ventral wall of copulatory bursa basally robust, without frill. For detailed description see Thorell (1873).

Remarks.—The original description of *D. maurusia* is insufficient, as it lacks any drawings (Thorell 1873). Simon (1914) synonymized it with *D. crocata* without examining the type material, and this synonymy is still accepted [see Platnick (2006)]. Thorell's syntypes comprise a single male and two females. Both females belong to the same species. Since the species diversity of *crocata* group in northern Algeria is enormous, the pairing of these females with the male is not definite. The male corresponds with the description of *D. hamulata* Kulczyński 1897. Moreover the apical portion of the bulbus is identical in every detail with the detailed drawing of *D. hamulata* in Chyzer & Kulczyński (1897). Therefore, we propose to remove *D. maurusia* from the synonymy with *D. crocata* and consider *D. hamulata* a junior synonym of *D. maurusia*.

The record of *D. hamulata* from Turkey (Deeleman-Reinhold & Deeleman 1988) is erroneous as the bulbus depicted suggests it belongs to *D. flagellata* Grasshoff 1959.

A drawing of *D. crocata* in Drensky (1938) is remarkably similar to *D. maurusia*; however, neither *D. maurusia* nor *D. crocata* was found in Drensky's collection (Ch. Deltchev, pers. comm.). His drawing is probably a compilation of fig. 41a (general shape of *D. crocata* bulbus) and 41d (detail of apical part of *D. crocata* var. *hamulata* bulbus) from Chyzer & Kulczyński (1897).

Distribution.—This species is known from northern Algeria. The record from Slovakia (Gajdoš et al. 1999) is based on the reference in Chyzer & Kulczyński (1897); we consider this record referring to a single male doubtful. This species has never been found again despite an intensive search all over Slovakia (cf. Gajdoš et al. 1999). Furthermore, we failed to find this species at the only locality mentioned in Chyzer & Kulczyński (1897), Vranov nad Topľou. It appears that the type material of *D. hamulata* was mislabeled. The drawing of this species in Drensky (1938) does not seem to be based on material from Bulgaria (see Remarks). The material labeled with an American locality (see Material examined) is probably also from north



Figures 24–25.—Chelicerae, ventral view. 24. *Dysdera ninnii*; 25. *D. dubrovninnii*. Scale bars = 1 mm.

Africa because it contains not only *D. maurusia* but also another species belonging to the *crocata* group, the species-group which is exclusively restricted to northern Africa and closely adjacent regions.

Dysdera ninnii species-group

Remarks.—This species-group was first recognized by Deeleman-Reinhold (1988). Two closely related representatives of this group have been found to occur in central Europe, *D. ninnii* Canestrini 1868 and *D. dubrovninnii* Deeleman-Reinhold 1988.

Dysdera ninnii Canestrini 1868

Figs. 9–12, 18, 24, 26

Aranea hombergi Scopoli 1763:403 (nomen dubium).

Dysdera ninnii Canestrini 1868:190; Canestrini & Pavesi 1868:845; Canestrini & Pavesi 1870:25, plate 3, fig. 2; Herman 1879:204–205; Chyzer & Kulczyński 1897:268, plate 10, fig. 44; Roewer 1928a:49, plate 7, fig. 561; Drensky 1938:93, fig. 8d (possibly compilation of figures from Chyzer & Kulczyński (1897) and Simon (1914)); Loksa 1969:74, figs. 49B, D, 50, 51A–B; Deeleman-Reinhold & Deeleman 1988:180, figs. 14, 16, 111–118; Heimer & Nentwig 1991:44, fig. 92; Thaler & Knoflach 2002:418, figs. 6–7; Pesarini 2001: figs. 7, 9, 11; Schult 1983:71, fig. 6 (misidentification); Simon 1914:95, 112, fig. 159 (doubtful).

Dysdera pavesii Thorell 1873:564 (doubtful).

Type specimens.—*Dysdera hombergi*: syntypes: SLOVENIA: unknown number of specimens, Carniola (repository unknown, not examined).

Dysdera ninnii: syntypes: ITALY: unknown number of males and females, regions Trentino, Veneto and Modenese (repository unknown, not examined).

Dysdera pavesii: syntypes: ITALY: males and females, G. Canestrini (repository unknown, not examined).

Material examined.—AUSTRIA: 1 ♀, unspecified location (NHRS). BOSNIA & HERCEGOVINA: 1 ♀, Visovica [43°59'N, 18°27'E], 22 June 1893, L. Gíró (HNHM). CROATIA: 1 ♂, 21 ♀, Velebit, Paklenica [44°19'N, 15°28'E], 18–21 June 2005, M. Řezáč (MR); 3 ♀, Šibenik, Solaris [43°44'N, 15°53'E], 16–17 June 2005, M. Řezáč (MR); 4 ♀, Plitvička jezera, Korana [44°54'N, 15°36'E], 22 June 2005, M. Řezáč (MR). CZECH REPUBLIC: *Tišnovsko area*: 1 ♀, Horní Čepí near Nedvědice [49°28'N, 16°20'E], 10 May, F. Miller (NMPC); 2 ♀, Doubavník [49°26'N, 16°22'E], 10 June 1983, F. Miller (NMPC). *Pálava biospheric reserve*: 1 ♀, Pouzdřany, reserve Pouzdřanská step-Kolby [48°56'N, 16°38'E], 1983, F. Miller (NMPC); 1 ♀, same location, 24 April–22 May 2005, S. Vinkler (VB). *Moravský kras area*: 1 ♂, 2 ♀, 1 juvenile, Blansko, Těchov, reserve Vývěry Punkvy, Skalní mlýn [49°23'N, 16°47'E], 21 May 1993, 31 May 1997–27 May 1998, V. Růžička (VR); 1 ♂, 2 ♀, Brno, reserve Kavky [49°11'N, 16°36'E], 18 May 2005, 18 October 2005, S. Vinkler (VB). *Jihlavské vrchy mountains*: 1 ♂, Brtnice, Přímělkov [49°21'N, 15°43'E], 8 June–11 July 1995, A. Jelínek (AJ); 1 ♀, Brtnice, Rokštejn ruin [49°19'N, 15°43'E], 26 May 1994, E. Svatoňová (JS). *Znojemská pahorkatina (hilly country)*: 1 ♂, Mohelno, reserve Hadcová step [49°06'N, 16°10'E], 1 June 1983, F. Miller (NMPC); 3 ♂, 4 ♀, Vranov nad Dyjí, Braitava [48°53'N, 15°48'E], 9–24 May 1995, 15 May–5 June 1996, 28 August–18 September 1996, 18 September–9 October 1996, 9–30 October 1996, A. Reiter (VB); 1 ♀, 1 juvenile, Vranov nad Dyjí [48°53'N, 15°48'E] (NMPC). HUNGARY: 4 ♀, 1 juvenile, Misina hill above Pécs [46°05'N, 18°13'E], 30 September 2006, M. Řezáč (MR).

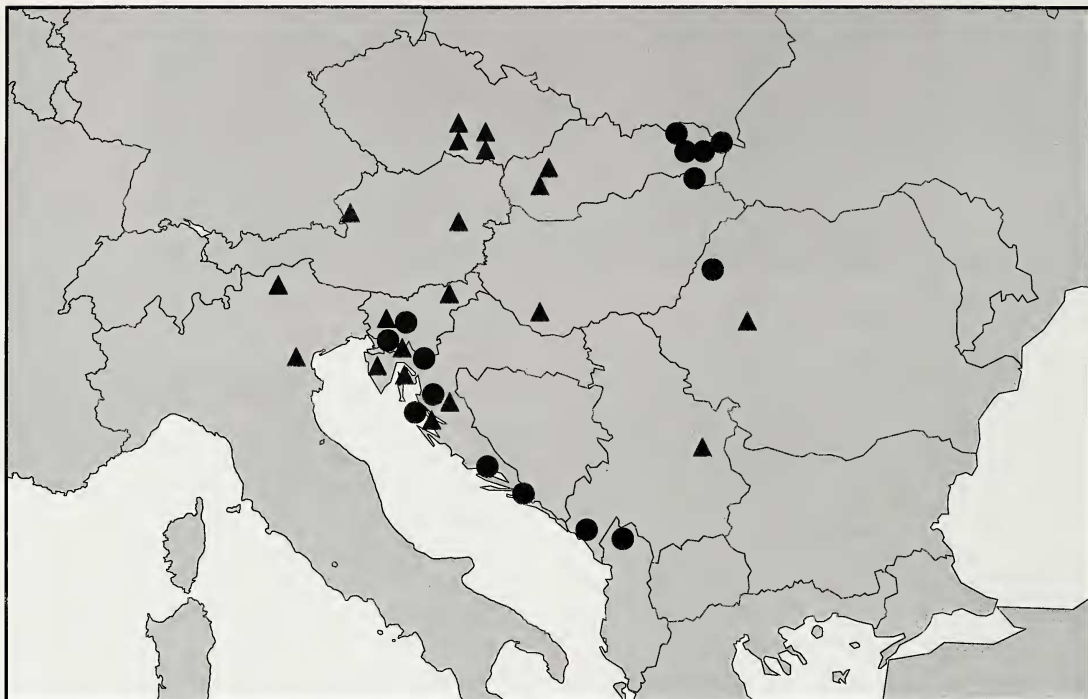


Figure 26.—Distribution of *Dysdera ninnii* (▲) and *Dysdera dubrovninnii* (●) in central Europe.

ITALY: 1 ♂, 1 ♀, Gorizia, Monfalcone [45°48'N, 13°31'E], 14 April 1991, F. Gasparo (MR); 1 ♂, 1 ♀, Trieste, Muggia, S. Floriano [45°36'N, 13°46'E], 19 April–15 May 2000, G. Colombetta (MR). ROMANIA: 1 ♀, Banat area, Carasova, Anina, Sopotu Nou [44°48'N, 21°51'E], 5–10 August 1998, V. Lemberk (MR). SLOVAKIA: 1 ♀, unspecified location, E. Žitňanská (JS). SLOVENIA: 1 ♀, Bepše pri Logatcu [45°55'N, 14°13'E], September 1934 (NMPC); 1 ♀, Kamniška Bistrica [46°20'N, 14°35'E], 8–15 August 1921, J. Hadži (NMPC); 1 ♀, Maaswald, Soča, Kranj, Unt [46°14'N, 14°16'E] (ZMHB). YUGOSLAVIA: 1 ♀, Belgrade [44°47'N, 20°28'E] (NMPC).

Diagnosis.—*Dysdera ninnii* is very similar to several species that are restricted to the Balkan and Apennine Peninsula. For diagnosis see Deeleman-Reinhold & Deeleman (1988). From other central European species, except for *D. dubrovninnii*, it differs by smooth carapace with rounded pits.

Description.—*Carapace* (Fig. 9): carapace 3.2–3.9 mm long, smooth, with rounded pits, darkly ferruginous, gibbous. Margins indented. Lateral margins of cephalic region convergent. *Chelicerae* (Figs. 9, 24): basal segment length/carapace length = 0.37. Dorsal sides of basal

segments straight, smooth, covered with piligerous pits. Groove slightly elongated (length of groove/basal segment length = 0.52), equipped with three small close teeth in basal third. Basal cheliceral tooth > median cheliceral tooth > distal cheliceral tooth. Fangs elongated (fang length/carapace length = 0.35), thorn-shaped. *Legs*: femora spineless. Tibiae III–IV dorsally spineless, ventrally usually with only a single apical spine. *Bulbus* (Figs. 10, 11): distal division with simply incurved lateral sheet projection and with flagellum. Apex with short subapical tooth. *Vulva* (Fig. 12): spermatheca almost as wide as dorsal arch. Dorsal arch wider than long. For detailed description see Deeleman-Reinhold & Deeleman (1988).

Remarks.—The oldest name related probably to this species is *D. hombergi*. Scopoli (1763) described this species as a spider with a shiny punctate carapace and shiny yellow legs. This is in contradiction with the appearance of any species of the genus *Harpactea* Bristowe 1939 for which this name is erroneously used [see also Thaler & Knoflach (2002)]. From all dysderid species occurring in the type locality “Carniola” (an ancient province in Slovenia), the type description fits two species, *D. ninnii* and *D. dubrovninnii*. The latter species is very

rare in this region, and it is likely that Scopoli described *D. ninnii*. However, his type material is probably lost; thus a definitive resolution of its identity is not possible. Therefore, we hereby designate *Aranea hombergi* as a nomen dubium.

We consider the synonymy of *D. pavesii* with *D. ninnii* (Platnick 2007) to be doubtful. In Italy, at the type locality of *D. pavesii*, several closely related species of the *ninnii* group occur. Thorell (1873) described this species based on material provided by G. Canestrini five years after Canestrini had described *D. ninnii*. Thus, Thorell was presumably aware of the existence of *D. ninnii*.

A drawing of the bulbus in Schult (1983) and perhaps also in Simon (1914), both attributed to *D. ninnii*, probably represents an undescribed species from Corsica.

Karyotype.—The male karyotype is composed of seven pairs of autosomes and a single X chromosome (Fig. 18). The sex chromosome system is thus X0.

Habitat.—In the Czech Republic and Hungary this species occurs in xerothermic forests on slopes (e.g., plant communities *Carpinion* and *Quercion pubescenti-petraeae*), in bushes (e.g., *Berberidion*) and in the shaded parts of rocky steppes (e.g., *Festucion valesiacae*). It is also common in semi-ruderal habitats, especially in the surroundings of ruins (particularly castle ruins) overgrown by bushes. In Croatia and Slovenia it occurs in lowland *Carpinus* and planted *Pinus* forests as well as in mountain *Picea*, *Fagus sylvatica*, and *Pinus nigra* forests.

Phenology.—Mating takes place from April to June, eggs are laid in June and July. Spiderlings disperse from maternal silk retreats from August to September. The spiders mature in autumn of the following year, overwinter as adults, and mate the next spring. Thus this species has a biennial life-cycle.

Distribution.—*Dysdera ninnii* is also known from the northwestern part of the Balkan Peninsula and northeastern Italy. In Slovenia and Croatia it occurs sympatrically with *D. dubrovninnii* (syntopical localities: Bač, Bepše pri Logatcu, Paklenica, Planina, Plitvička jezera, Postojna, Šibenik). The record from southern France (Simon 1914) remains to be confirmed. The northern border of its distribution runs through the Czech Republic and Slovakia, where it occurs only in the Pannonian region (Fig. 26).

The distribution maps were published by Deeleman-Reinhold & Deeleman (1988:260, map 7; for the whole area), Drensky (1938:14, map 2; for the entire area, partly based on misidentifications), Deltshev et al. (2003:251, map 19, for Serbia), Gajdoš et al. (1999: map 200, for Slovakia, together with undistinguished *D. dubrovninnii*), and Buchar & Růžička (2002:205, for the Czech Republic). The map of *D. punctata* in Gajdoš et al. (1999: map 210) probably also refers to this species.

Dysdera dubrovninnii Deeleman-Reinhold 1988
Figs. 13–16, 19, 25, 26

Dysdera dubrovninnii Deeleman-Reinhold in
Deeleman-Reinhold & Deeleman 1988:184,
figs. 125–128.

Type specimens.—*Dysdera dubrovninnii*: CROATIA: holotype male, Babin kuk, Dubrovnik (42°39'N, 18°05'E), 10 April 1976, J. & F. Murphy (BMNH, not examined). Paratypes: 1 female, collected with holotype (BMNH, not examined); 1 male, 2 females, Dubrovnik, 19 & 22 April 1976, J. & F. Murphy (coll. J. & F. Murphy, Hampton, UK, not examined); 3 males, 1 female, Dalmatia, Croatia (MHNG, not examined).

Material examined.—CROATIA: 1 ♂, Korčula town [42°56'N, 16°54'E], 26 August 1997, F. Gasparo (FG); 1 ♀, Lanaka [45°53'N, 17°35'E], July 1935 (NMPC); 1 ♂, 12 ♀, Velebit, national park Paklenica, surroundings of Vaganski vrh and Ivine Vodice [44°19'N, 15°28'E], 20 June 2005, M. Řezáč (MR); 1 ♀, Šibenik, Solaris [43°42'N, 15°51'E], 16–17 June 2005, M. Řezáč (MR); 1 ♀, Plitvička jezera, Korana [44°54'N, 15°35'E], 22 June 2005, M. Řezáč (MR). ROMANIA: 1 ♂, 2 ♀, Hideselu de Jos, Bihor mountains [46°57'N, 22°03'E], May–September 2004, I. Sas (MR). SLOVAKIA: *Beskydské predhorie mountains*: 1 ♂, 4 ♀, Humenné, reserve Podskalka [48°54'N, 21°55'E], 30 July–25 August 1987, 7 July 1994, 21 May–22 June 1994, 5 September 2002, V. Thomka (VMH); 1 ♀, same location, 14 August 2003, M. Řezáč (MR); 2 ♂, Kamenica nad Cirochou [48°55'N, 21°59'E], 13 August–2 November 1998, 11 May–16 July 1999, V. Thomka (VMH); 5 ♂, 1 juvenile, Kamenica nad Cirochou, Hôrka [48°55'N, 21°59'E], 13 August 1998, 20 October 1999–2 May 2000, 2 May–6 July 2000, V. Thomka (VMH); 8 ♂, 1 ♀, Kamenica nad Cirochou, Žbir

- [48°55'N, 21°59'E], 18 May–30 July 2001, 18 May–30 July 2001, 30 July–26 September 2001, 29 October 2001–3 May 2002, V. Thomka (VMH); 2 ♂, Dlhé nad Cirochou [48°57'N, 22°03'E], 10 September 1998–2 June 1999, 8 September–23 October 2000, V. Thomka (VMH); 1 ♂, 1 ♀, 2 juveniles, Ptíčie, reserve Humenský Sokol [48°53'N, 21°57'E], 20 May–3 August 1993, 30 June 1994, 3 October 1994, V. Thomka (VMH); 6 ♂, 3 ♀, 1 juvenile, Brekov castle [48°53'N, 21°49'E], 28 April–3 July 1998, 5 October 1998, 3 July–5 October 1998, 24 August 1999, 2 November 1999, 4 May–30 June 1999, 5 October 1998–4 May 1999, 2 November 1999–27 April 2000, V. Thomka (VMH); 1 ♀, 1 juvenile, Kamienka, Spálené mosty [48°54'N, 22°00'E], 1 October 1996–13 June 1997, V. Thomka (VMH); 21 ♂, 8 ♀, 9 juveniles, Lackovce, pod Velikou [48°56'N, 21°56'E], 4 May–2 July 2001, 2 July–31 August 2001, 23 May–9 July 2002, 12 April–23 May 2002, 5 November 2001–12 April 2002, 23 May–9 July 2002, 4 September–17 October 2002, 12 April–23 May 2002, 9 July–4 September 2002, V. Thomka (VMH). *Bukovské vrchy mountains*: 1 juvenile, Kalná Roztoka, reserve Havešová [48°58'N, 22°19'E], 27 May–30 July 1999, V. Thomka (VMH); 1 ♀, same location, 21 September 1998, J. Svatoň (JS); 1 ♂, 1 ♀, Nová Sedlica [49°02'N, 22°31'E], 15 June 1980, V. Thomka (VMH); 1 ♂, Kolbasov, reserve Bzana [49°00'N, 22°22'E], 17 May–26 July 2000, V. Thomka (VMH); 1 ♂, 2 ♀, 1 juvenile, Ošadné, reserve Hlboké [49°09'N, 22°10'E], 3 August–15 October 1999, 1 June–3 August 1999, 26 May–3 August 2000, V. Thomka (VMH); 1 ♂, Ruské, reserve Pod Ruským [49°07'N, 22°20'E], 27 October 2000–21 May 2001, V. Thomka (VMH); 1 ♂, Zboj, reserve Riaba skala [49°01'N, 22°29'E], 12 October 1994–1 June 1995, V. Thomka (VMH). *Košická kotlina basin*: 1 ♂, 1 juvenile, Prešov, castle [48°59'N, 21°14'E], 8 July 1934, F. Miller (NMPC). *Laborecká vrchovina mountains*: 1 ♂, Stakčín, reserve Hrnok [49°00'N, 22°13'E], 11 May–26 July 2000, V. Thomka (VMH); 4 ♂, 1 ♀, 1 juvenile, Stakčín, dolina Chotínka valley [49°00'N, 22°13'E], 15 June 1995, 21 October 1999–11 May 2000, 25 July–9 October 2000, 11 May–25 July 2000, V. Thomka (VMH); 1 ♂, Snina [48°58'N, 22°09'E], 9 May–11 August 2000, V. Thomka (VMH); 2 ♂, 1 ♀, 1 juvenile, Roškovec, reserve Jarčiská [49°14'N, 21°50'E], 4 September 2001–15 March 2002, 15 March–27 May 2002, 27 May–16 July 2002, V. Thomka (VMH); 5 ♂, 3 ♀, 1 juvenile, Starina, reserve Starina [49°03'N, 22°15'E], 30 July–3 September 1999, 25 July–9 October 2000, 19 October 1999–11 May 2000, 11 May–25 July 2000, V. Thomka (VMH). *Ondavská vrchovina mountains*: 1 ♂, Humenné, Holá hora hill [48°56'N, 21°53'E], 14 November 1996, V. Thomka (VMH); 2 juveniles, Myslina [48°56'N, 21°50'E], 10 July 1995, V. Thomka (VMH); 20 ♂, 4 ♀, 1 juvenile, Humenné [48°55'N, 21°54'E], 14 October 1996, 4 October 1999, 12 June–17 August 2000, 28 April–12 June 2000, 17 August–20 October 2000, 30 April–25 June 2001, 25 June–9 August 2001, V. Thomka (VMH); 1 ♂, same location, 18–19 July 2004, F. Šťáhlavský (MR). *Spišsko-šarišské medzihorie mountains*: 2 juveniles, Kapušany, reserve Kapušianský hradný vrch [49°02'N, 21°19'E], 6 July 1934, F. Miller (NMPC); 5 ♂, 1 ♀, 1 juvenile, same location, 23 April–20 June 1996, 20 June–30 August 1996, 1 July 1997, 30 August 1996–20 May 1997, V. Thomka (VMH). *Vihorlatské vrchy mountains*: 1 ♀, Brekov, Krivošňany [48°53'N, 21°50'E], 11 September 2002, V. Thomka (VMH); 1 juvenile, Ptíčie, reserve Humenské [48°53'N, 21°57'E], 12 August–21 October 2002, V. Thomka (VMH); 2 ♀, Remetské Hámre [48°51'N, 22°11'E], 27 October, F. Miller (NMPC); 7 ♂, 6 ♀, 2 juveniles, Chlmec, reserve Chlmecská skalka [48°53'N, 21°56'E], 21 September–13 November 2001, 17 June–7 August 2002, 16 April–17 June 2002, 7 August–29 October 2002, V. Thomka (VMH); 1 ♀, 4 juveniles, Jasenov pri Humennom, castle [48°54'N, 21°53'E], 26 August 1994, 28 June 1999, V. Thomka (VMH); 2 ♂, 1 juvenile, Jasenov-Hôrka [48°54'N, 21°53'E], 30 July–27 August 1987, 2–29 June 1987, 13 May–15 June 1994, V. Thomka (VMH); 1 ♀, Vinné, Vinnianské jazero lake [48°48'N, 21°58'E], 16 August 2003, M. Řezáč (MR); 7 ♀, Vinné town [48°48'N, 21°58'E], 13 July 1967, J. Vachold (PG); 7 ♂, 4 ♀, 2 juveniles, Vinné, reserve Vinnianský hradný vrch [48°48'N, 21°58'E], 3 June–31 July 1992, 9 March–3 June 1992, 13 July–19 August 1993, 19 August 1993, 22 April 1994, 22 April–24 June 1994, 8 August–26 September 1994, V. Thomka (VMH); 1 ♀, same location, 17 August 2003, M. Řezáč (MR). *Východoslovenská pahorkatina (hilly country)*: 3 ♂, 2 ♀, Klokočov pri Zemplínskej Širave [48°49'N, 22°01'E], 12 September, F. Miller (NMPC). SLOVENIA: 1 ♂, Postojna [45°46'N,

14°12'E], 25 October 1994, S. Polak (UL); 1 ♀, Bač [45°37'N, 14°16'E], 8–24 May 1994, S. Polak (UL); 1 ♀, 1 juvenile, Planina, Unška koliševka chasm [45°50'N, 14°15'E], 2000, M. Řezáč (MR); 1 ♀, Bepše pri Logatcu [45°55'N, 14°13'E], September 1934 (NMPC).

Diagnosis.—This is the only central European species of *Dysdera* that possesses dorsoventrally flattened cheliceral fangs. It is further distinguished from *D. ninnii* by the smaller body, lighter coloration, less gibbous carapace with no indented margins, and by the shape of the bulbus (e.g., lateral sheet apophysis missing, doubly incurved lateral sheet), and endogyne (narrower spermatheca).

Description.—*Carapace* (Fig. 13): carapace 2.6–4.4 mm long, smooth, with rounded pits, ferruginous, slightly gibbous. Margins not indented. Lateral margins of cephalic part convergent. *Chelicerae* (Figs. 13, 25): basal segment length/carapace length = 0.35. Basal segments dorsally convex, smooth, covered with piligerous pits. Groove slightly elongated (length of groove/basal segment length = 0.56), with three small teeth in basal half. Basal cheliceral tooth > median cheliceral tooth > distal cheliceral tooth. Teeth equally distant. Fangs short (fang length/carapace length = 0.28), dorsoventrally flattened. *Legs*: femora spineless. Tibiae III–IV dorsally spineless, ventrally usually with only a single apical spine. *Bulbus* (Figs. 14, 15): distal division with hook-shaped, twice incurved lateral sheet projection and flagellum. Subapical tooth absent. *Vulva* (Fig. 16): spermatheca narrower than dorsal arch. Dorsal arch wider than long. For detailed description see Deeleman-Reinhold & Deeleman (1988).

Remarks.—*Dysdera dubrovninnii* was based on material from the countries of the former Yugoslavia and from northern Albania. Therefore, the discovery of this species in central Europe was unexpected.

Karyotype.—The male karyotype is composed of eight pairs of autosomes and a single sex chromosome (Fig. 19). Details of the male meiotic division indicated the sex chromosome system X0.

Habitat.—In central Europe, the habitats of *D. dubrovninnii* are similar to that of *D. ninnii*. It occurs on bed-rocks rich in minerals within xerothermic natural (*Quercus* spp., *Carpinus betulus*, rarely *Fagus sylvatica*) or planted forests (e.g., *Pinus* sp.). In the Balkan Peninsula

it occurs in a wide range of elevations (from planted pine forests on the seashore to mountain beech forests). In southwestern Balkan (Slovenia and Croatia), where this species co-occurs with *D. ninnii*, it prefers marginal habitats such as villages, stony debris in cold chasms, steppes, alpine grasslands and mountain *Pinus mugo* bush. In comparison with *D. hungarica* it occurs on relatively more humid and more shaded habitats as evident from syntopic occurrence in Vinnianský hradný vrch hill in Slovakia.

Phenology.—Similar to that of *D. ninnii* in central Europe.

Distribution.—This species has been previously known only from the countries of the former Yugoslavia (Croatia, Slovenia, southern Montenegro) and from northern Albania (Deeleman-Reinhold & Deeleman 1988). Recently, it has been discovered in Romania and the eastern part of Slovakia, but erroneously identified as *D. ninnii* (e.g., Thomka 1997). The distribution of *D. dubrovninnii* and *D. ninnii* do not overlap in the northern part of central Europe (Fig. 26). In contrast, they occur sympatrically but rarely in the same localities in the northwest part of the Balkan Peninsula (syntopic localities in Slovenia: Bač, Bepše pri Logatcu, Postojna, Planina; Croatia: Paklenica, Plitvička jezera, Šibenik). Since *D. dubrovninnii* presumably dispersed to central Europe from northwestern Balkans, it is likely to also occur in Hungary. It probably also occurs in southeastern Poland and westernmost Ukraine, since the known localities in eastern Slovakia are close to the Polish and Ukrainian borders. A distribution map was published by Deeleman-Reinhold & Deeleman (1988: 261, map 9). The map of *D. ninnii* in Gajdoš et al. (1999: map 200) partially refers to this species.

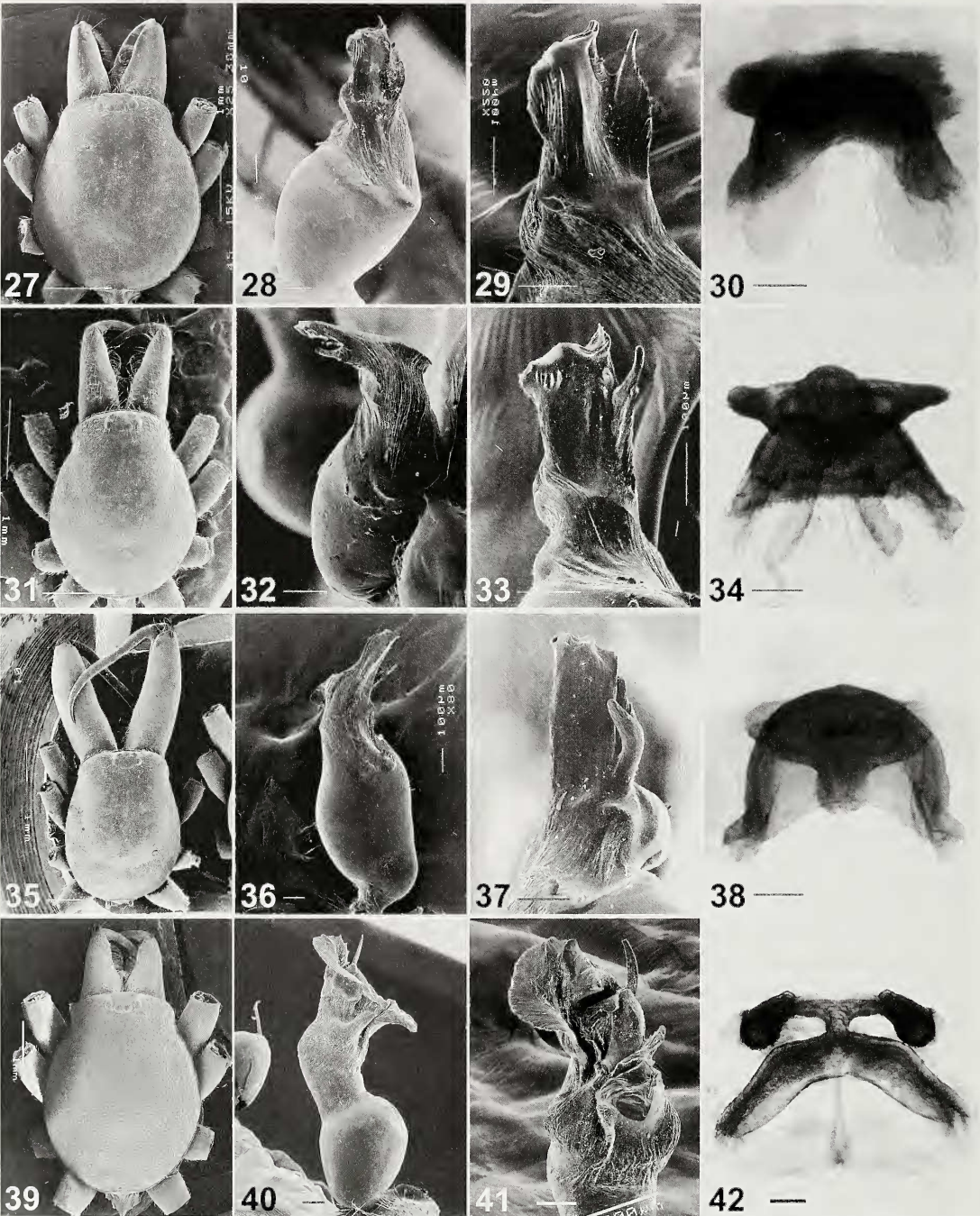
Dysdera longirostris species-group

Remarks.—Deeleman-Reinhold (1988) first established this species-group. Three species of the group are known from central Europe. Although they can be relatively easily distinguished, much confusion exists in the literature.

Dysdera hungarica Kulczyński 1897

Figs. 20, 27–30

Dysdera hungarica Kulczyński, in Chyzer & Kulczyński 1897:268, plate 10, fig. 42; Roewer 1928a:49, plate 7, fig. 563 (probably



Figures 27–42.—Characters of central European *Dysdera* species, *Dysdera longirostris* and *D. lata* groups. 27–30. *D. hungarica*, male from Michalovce, Slovakia; female from Prague, Czech Republic; 31–34. *D. adriatica*, male and female from Postojna, Slovenia; 35–38. *D. longirostris*, male and female from Yalta, Crimea; 39–42. *D. taurica*, male from Nidde, Turkey; female from Konya, Turkey. 27, 31, 35, 39. Male prosoma, dorsal view; 28, 32, 36, 40. Bulbus; 29, 33, 37, 41. Detail of distal division of bulb; 30, 34, 38, 42. Anterior diverticle of vulva. Scale bars = 1 mm (prosomas), 0.1 mm (bulbi, vulvae).

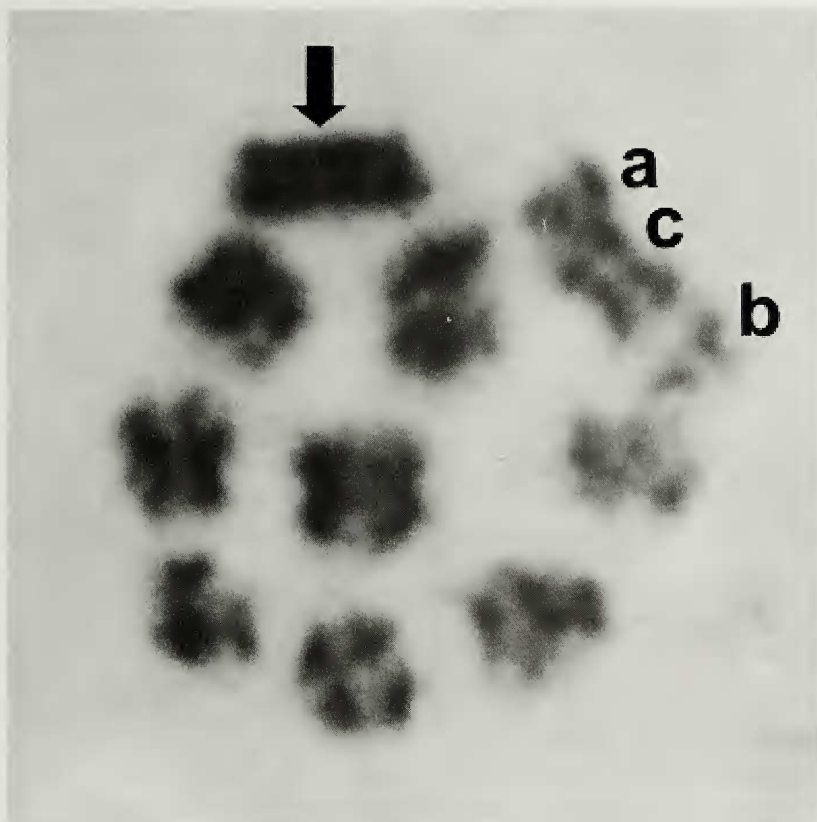


Figure 43.—*Dysdera adriatica*, male metaphase I. Note autosome trivalent (a, b – short chromosomes, c – long chromosome) and positively heteropycnotic X chromosome (arrow) on the periphery of the nucleus. Scale bar = 10 μ m.

redrawn after Chyzer & Kulczyński 1897); Charitonov 1956:26, fig. 17; Loksa 1969:78, figs. 53A–C; Polenec 1985:103, fig. 8; Deeelman-Reinhold & Deeelman 1988:168, figs. 60–65; Heimer & Nentwig 1991:44, fig. 96; Dunin 1992:64, fig. 9; Řezáč & Bryja 2002:75, figs. 1–2; Thaler & Knoflach 2002:428, fig. 8.

Dysdera longirostris Doblika: Miller 1971:74, plate 5, fig. 6.

Type specimens.—*Dysdera hungarica*: syntypes: SLOVAKIA: 1 male, 7 females, Hrušov (= Körtvélyes) (48°35'N, 20°37'E), C. Chyzer (HNHM, examined). HUNGARY: unknown number of adult specimens: Satorvaralja Ujhely (48°23'N, 21°39'E), Kám (47°05'N, 16°52'E), Budapest (Kelenföld, Gellérthegey) (47°28'N, 19°02'E), Kalocsa (46°31'N, 18°59'E), Marillavölgy (47°25'N, 18°38'E) (repository unknown, not examined). ROMANIA: unknown number of adult specimens: Zalău – Meseş mountains

(=Zilah – Meszeshegy) (47°10'N, 23°03'E), Cluj (=Koložsvár) (46°46'N, 23°36'E), Gherla (=Szamosújvár) (47°01'N, 23°53'E), Alba Iulia (=Gyulafehérvár) (46°04'N, 23°34'E), Sibiu (=Nagy-Szeben) (45°47'N, 24°08'E), Hațeg (=Hátszeg) (45°36'N, 22°57'E) (repository unknown, not examined).

Material examined.—AUSTRIA: *Burgenland*: 2 ♀, Seewinkel, western Stundlacke [47°50'N, 16°40'E], 6 August–30 October 1960, J. Gruber (NMW); 3 ♀, Parndorfer Platte [47°59'N, 16°51'E], 1988–1989, K.H. Steinberger (NMW); 1 ♀, north Leithagebirge, Bruckneudorf [48°00'N, 16°46'E], 23 April 1963, J. Gruber (NMW); 1 ♀, Leithagebirge, Eisenstadt [47°50'N, 16°32'E], 8 May 1963, J. Gruber (NMW). *Nordtirol*: 5 ♀, Ahrnkopf near Innsbruck [47°12'N, 11°25'E], 1983–1984, K.H. Steinberger (NMW); 3 ♀, 1 juvenile, same location, 26 September 2005, M. Řezáč (MR). *Wachau*: 1 ♀, Dunkelsteiner Wald, Unterloiben [48°22'N, 15°31'E], 21 May 1998, J. Gruber

- (NMW). *Wien*: 1 ♂, [48°11'N, 16°25'E], 2 July 2006, W. Nentwig (MR); 3 ♀, Wien II, Unterer Prater [48°11'N, 16°25'E], 29 March 1981, 7 June 1980, 14 December 1980, J. Gruber (NMW); 1 ♀, Wien III, Alter St. Marxer Friedhof [48°12'N, 16°21'E], 26 May–17 June 1973, J. Gruber (NMW); 4 ♀, Wien X, Laaer Wald [48°12'N, 16°21'E], 12 April 1980, 15 August 1980, J. Gruber (NMW); 1 ♀, 1 juvenile, Wien XI, Zentralfriedhof [48°12'N, 16°21'E], 2–21 June 1973, J. Gruber (NMW); 66 ♀, 3 juveniles, Wien XIX, Grinzing [48°16'N, 16°20'E], 22–26 April 1986, 26 April–18 May 1986, 1 June 1980, 12 May 1983, 17 April 1983, 3–4 April 1983, 22 May 1982, 3 September 1978, 26 July 1981, 19 June 1986, 19–23 April 1983, 13 May 1978, 10 April 1983, 29 July 1977, 27 March 1983, 20 April 1980, 15 May 1982, 27 April 1983, 19 May 1977, 2 July 1983, 2 June 1983, 30 April 1978, 11 May 1980, J. Gruber (NMW); 3 ♀, Wien XIX, Kaasgraben [48°16'N, 16°20'E], 29 September 1960, 31 May 1956, 16 May 1964, J. Gruber (NMW); 1 ♀, Bisamberg near Wien, Ortschaft [48°19'N, 16°21'E], 15 July 1989, J. Gruber (NMW). *Wiener Becken*: 1 ♀, 1 juvenile, southern Haslau [48°06'N, 16°42'E], 8 August–1 September 1960, J. Gruber (NMW); 2 ♀, southwestern Tattendorf [47°57'N, 16°17'E], 21 October 1989, J. Gruber (NMW). *Wiener Wald*: 2 ♀, Königstetten [48°18'N, 16°08'E], 24 May–22 June 1975, J. Gruber (NMW); 2 ♀, Unter-Purkersdorf [48°12'N, 16°10'E], 27 September 1980, J. Gruber (NMW). **BULGARIA**: 4 ♀, Kranevo near Zlatni piasaci, Varna area [43°20'N, 28°02'E], 10 August 2005, M. Řezáč (MR). **CZECH REPUBLIC**: *Brno*: 2 ♀, reserve Kavky [49°11'N, 16°36'E], 8 May 2004, 29 June 2005, S. Vinkler (VB); 3 ♀, reserve Obřanská stráň [49°11'N, 16°36'E], 8 May 2005, S. Vinkler (VB); 4 ♀, Kopanina [49°15'N, 16°35'E], 15 June 2005, 17 August 2005, 5 October 2005, S. Vinkler (VB). *Pálava biospheric reserve*: 1 ♀, reserve Svatý kopeček [48°47'N, 16°38'E], 14 September–22 October 2001, M. Hluchý (VB); 1 ♀, Milovický les wood [48°50'N, 16°43'E], 14 May 2003, J. Chytil (VB); 1 ♀, Mikulov, reserve Kočičí skála [48°48'N, 16°37'E], 6–11 June 1996, J. Chytil (VB); 1 ♀, Dolnodunajovický potok stream [48°51'N, 16°36'E], 21 March 2004, V. Bryja (MR); 5 ♀, Dolní Dunajovice, reserve Dolnodunajovické kopce [48°50'N, 16°33'E], 16 May–28 May 2004, 7 June–6 August 2004, 6 August–27 September 2004, S. Vinkler (VB); 2 ♀, Kinberk [48°47'N, 16°49'E], 30 September–28 November 2003, 20 March–20 May 2004, J. Chytil (VB); 3 ♀, Mikulov, reserve Slanisko u Nesytu [48°46'N, 16°41'E], 15 October 1993, J. Chytil (JS); 25 ♀, 2 juveniles, Pouzdřany, reserve Pouzdřanská step-Kolby [48°56'N, 16°37'E], 16 May–12 June 2004, 12 June–25 August 2004, 4 July–7 August 2004, 7 August–19 September 2004, 19 September–17 October 2004, 17 October–10 November 2004, 10 November 2004–4 January 2005, 12 June–12 July 2005, 12 July–6 August 2005, 30 September 2005, 28 October 2005, S. Vinkler (VB); 4 ♀, Pouzdřany, Kolby [48°57'N, 16°38'E], 30 July 1968, 25 May 1969, 20 November, 20 May, F. Miller (NMPC); 25 ♀, same location, 16 May–12 June 2004, 7 August–19 September 2004, 19 September–17 October 2004, 17 October–10 November 2004, 24 April–22 May 2005, 22 May–12 June 2005, 28 October 2005, S. Vinkler (VB). *Podyjí area*: 1 ♀, Havraníky, reserve Údolí Dyje, Šobes [48°48'N, 15°58'E], 13–17 June 1999, M. Řezáč (MR). *Prague*: 10 ♀, Ruzyně [50°05'N, 14°17'E], 22 June 1994, 30 June 1994, 15 September 1994, 23 May 1996, 10 June 1997, S. Pekár (MR). **HUNGARY**: 1 ♀, Velence [47°14'N, 18°39'E], 18 May 1951, L. Balogh & E. Somfai (HNHM); 1 ♀, same location, 16 June 1951, L. Vas-Borosy (HNHM); 3 ♀, 2 juveniles, Nadap, Meleghegy [47°15'N, 18°37'E], 9 June 1951, K. Zoltán (HNHM); 2 ♀, Nadap [47°15'N, 18°37'E], 24 October 1951, K. Zoltán (HNHM); 7 ♀, Pákozd, Bella völgy valley [47°13'N, 18°32'E], 9 October 1951, K. Zoltán (HNHM); 1 ♀, Alsópetény [47°53'N, 19°14'E], July 1944, I. Loksa (HNHM); 1 ♀, Győr [47°40'N, 17°38'E], July 1949, I. Andrassy (HNHM); 1 ♀, Balatonfüred, Tihany peninsula [46°55'N, 17°52'E], June 1928 (HNHM); 4 ♀, 1 juvenile, same location, 28 September 2006, M. Řezáč (MR); 1 ♀, Pécs, foot of the Misina hill [46°05'N, 18°13'E], 30 September 2006, M. Řezáč (MR); 1 ♀, Mohácsi sziget island, Kőlkendi erdő forest [45°56'N, 18°42'E], 23 April 1923, E. Bokor (HNHM); 4 ♀, 2 juveniles, Szombathely, near the main railway station [47°13'N, 16°37'E], 1 October 2006, M. Řezáč (MR). **ROMANIA**: 2 ♀, Bucharest [44°26'N, 26°06'E], 1909, A.S. Montandon (NMPC); 1 ♂, 1 ♀, Transsylvania, 1914 (NMPC); 2 ♂, 3 ♀, Hideselu de Jos, Bihor mountains [46°57'N, 22°03'E], May–September 2004, I. Sas (MR); 2 ♀, Cluj [46°45'N,

23°57'E], 20 May 2006, W. Nentwig (MR); 1 ♂, Cluj, Suatu reserve [46°45'N, 23°57'E], 1998, I. Urák (MR); 1 ♂, mont Csik, Kászón, Salutaris [46°13'N, 26°08'E], 10–31 July 1943, Székessy (HNHM); 1 ♂, Tordai salty lake [46°33'N, 23°47'E], 10 May 1904, L. Gíró (HNHM). SLOVAKIA: *Burda mountains*: 1 juvenile, Chlába, Kováčov [47°50'N, 18°47'E], 22 June 1960, J. Žďárek (MR); 6 ♀s juveniles, Chlába [47°49'N, 18°49'E], 14 August–26 October 1978, 12 September–1 November 1977, 1 June 1977–18 July 1978, 22 August–12 September 1977, V. Petrůvský (PG). *Hornonitrianska kotlina basin*: 1 ♀, Bojnice [48°46'N, 18°34'E], 11 August 1961, J. Vachold (PG). *Hronská pahorkatina (hilly country)*: 2 ♀, Gbelce, reserve Parížske močiare [47°50'N, 18°30'E], 15 March–2 May 2001, 4 July–13 September 2001, P. Gajdoš (PG); 2 ♀, Paríž, reserve Gbelce [47°51'N, 18°32'E], 9 May 1999, 9 May–20 May 1999, O. Majzlan (PG); 1 ♀, Mužla, Čenkov [47°47'N, 18°35'E], 20 May–27 June 1998, O. Majzlan (PG). *Košická kotlina basin*: 1 juvenile, Svinica, Bidovce [48°44'N, 21°26'E], 25 July 1995, P. Gajdoš (PG). *Kremnické vrchy mountains*: 1 ♀, Budča, reserve Boky [48°34'N, 19°04'E], 1976, V. Thomka (VMH). *Krupinská planina plain*: 1 juvenile, Krupina town [48°21'N, 19°04'E], August 1963, J. Vachold (PG); 1 ♀, Litava [48°17'N, 19°10'E], 30 September 1963, J. Vachold (PG). *Malá Fatra mountains*: 1 ♀, Terchová, Rozsutec [49°17'N, 19°00'E], F. Miller (NMPC). *Malé Karpaty mountains*: 1 juvenile, Bratislava, reserve Devínská Kobyla [48°10'N, 17°00'E], 7 April–9 May 1978, P. Gajdoš (PG); 1 ♀, Pezinok, near Chrástina [48°17'N, 17°16'E], 27 May–24 June 1994, P. Gajdoš (PG); 1 juvenile, Pezinok, Stará hora hill, Wimperegly [48°18'N, 17°16'E], 17 July–15 December 1994, P. Gajdoš (PG); 1 ♀, Stupava, Vrchná hora hill [48°17'N, 17°02'E], 23 May–19 June 1999, O. Majzlan (PG); 1 ♀, Čachtice [48°43'N, 17°47'E], 25 July 1974, J. Vachold (PG). *Ondavská vrchovina mountains*: 2 ♀, Humenné [48°56'N, 21°54'E], 22 October 1990, 20 May 1996, V. Thomka (VMH). *Podunajská rovina lowland*: 30 ♀, 10 juveniles, Bohelov [47°56'N, 17°43'E], 2 April–7 May 1992, 6 May–3 June 1992, 3 June–2 July 1992, P. Gajdoš (PG); 1 ♀, Rusovce [48°03'N, 17°08'E], P. Gajdoš (PG); 1 ♀, Bratislava-Vinohrady, Vlčie hrdlo [48°10'N, 17°08'E], 10 April 1991, O. Majzlan (PG); 2 ♀, Čilizský potok stream [47°52'N, 17°37'E], 6 May–2

June 1992, 2 June–1 July 1992, P. Gajdoš (PG); 11 ♀, Jurová [47°56'N, 17°30'E], 2 June–1 July 1992, P. Gajdoš (PG). *Považské podolie*: 1 juvenile, Trenčín [48°53'N, 18°02'E], 19 June–24 July 1998, P. Gajdoš (PG). *Slovenský kras area—Plešivecká planina plateau*: 1 ♀, Kunova Teplica, Velký vrch hill [48°36'N, 20°22'E], 16 October 1984, J. Svatoň (JS); 2 ♀, Kružná, Velký vrch hill II [48°37'N, 20°26'E], 23 July 1984, J. Svatoň (JS); 1 ♂, Velká stráň [48°38'N, 20°23'E], 15 September 1983, J. Svatoň (JS); 1 ♂, Plešivec, Koniar, Hôrka [48°34'N, 20°24'E], 26 June 1984, J. Svatoň (JS). *Slovenský kras area—Silická planina plateau*: 1 ♂, Kečovo, reserve Kečovské škrapy [48°30'N, 20°28'E], 22 September 1982, J. Svatoň (JS); 1 ♂, 1 ♀, Kečovo, reserve Domické škrapy [48°28'N, 20°28'E], 25 May, F. Miller (NMPC); 1 ♀, same location, 22 September 1982, J. Svatoň (JS); 3 ♂, 2 ♀, same location, 22 August–8 October 2003, 8 October–26 November 2003, P. Gajdoš (PG); 1 ♀, Hrušov nad Turnou, reserve Hrušovská lesostep [48°35'N, 20°36'E], 23 August 1984, J. Svatoň (JS); 1 ♀, Jablonov, Hradište hill [48°36'N, 20°40'E], 16 October 1984, J. Svatoň (JS); 1 ♂, 1 ♀, Hrušov nad Turnou, Hradiško hill [48°36'N, 20°40'E], 19 August 2003, M. Řezáč (MR). *Spišsko-šarišské medzihorie mountains*: 1 ♂, Kapušany, reserve Kapušianský hradný vrch [49°02'N, 21°19'E], 31 July–9 October 1997, V. Thomka (VMH). *Tribeč mountains*: 2 ♀, Nitra, reserve Zoborská lesostep [48°20'N, 18°06'E], 1 May 1978, 1 May 1980, P. Gajdoš (PG); 1 ♀, Velčice, reserve Velčické cery [48°24'N, 18°18'E], 22 April–22 June 1985, P. Gajdoš (PG). *Vihorlatské vrchy mountains*: 3 ♀, Vinné, reserve Vinnianský hradný vrch [48°48'N, 21°58'E], 19 August 1993, V. Thomka (VMH); 1 ♂, 1 ♀, same location, 17 August 2003, M. Řezáč (MR). *Východoslovenská pahorkatina (hilly country)*: 1 ♂, 1 ♀, Velaty [48°28'N, 21°40'E], 18 August 2003, M. Řezáč (MR); 1 ♂, Vranov nad Topľou [48°53'N, 21°41'E] (MNH); 1 ♂, 1 ♀, same location, 15 August 2003, M. Řezáč (MR). *Zemplínske vrchy mountains*: 1 ♂, 1 ♀, Velká Tíňa, Rozhládňa [48°27'N, 21°41'E], 18 August 2003, M. Řezáč (MR). *Žitavská pahorkatina (hilly country)*: 1 ♀, Velké Janíkovce [48°17'N, 18°08'E], 24 September 1987, V. Petrůvský (PG); 3 ♀, Nitrianské Hrnčiarovce, Malanta, way to Pohranice [48°19'N, 18°07'E], 26 June 1991, 5 May 1992, 12 November 1992, P. Gajdoš (PG). UKRAINE: *Crimea*: 1 ♀,

Cherson Taurica, Simferopol [44°57'N, 34°06'E] (NHRS); 5 ♂, 8 ♀, Kordon Bukovskogo, 35 km S of Simferopol [44°42'N, 34°07'E], 18 July 2001, N. Kovblyuk (MR); 1 ♀, Yalta, Massandra Park [44°30'N, 34°11'E], 20 May–19 June 2001, N. Kovblyuk (MR).

Diagnosis.—*Dysdera hungarica* is closely related to *D. pristiphora* Pesarini 2001 described from northern Italy and *D. hungarica atra* Mcheidze 1979 and *D. hungarica subalpina* Dunin 1992 from the Caucasus. Among central European species it is characterized by the convergent lateral anterior margins of the carapace, the bulbus is characterized by a robust tegulum and the presence of a finger-like lateral sheet apophysis, and the vulva is characterized by two parallel chitinized bands on the ventral wall of the copulatory bursa.

Description.—*Carapace* (Fig. 27): carapace 2.5–3.4 mm long, slightly wrinkled, shiny, dark brown to ferruginous, dorsoventrally flat. Lateral margins of cephalic part convergent. *Chelicerae* (Fig. 27): basal segment elongate (basal segment length/carapace length = 0.53). Inner margin straight, dorsal side convex, smooth with sparse small hairy pits. Groove elongated (length of groove/basal segment length = 0.73), equipped with three small teeth in basal half. Median cheliceral tooth > basal cheliceral tooth > distal cheliceral tooth. Median cheliceral tooth close to basal tooth. Fangs elongated (fang length/carapace length = 0.52), thorn-shaped. *Legs*: femora spineless. Tibiae III–IV dorsally spineless, ventrally with a pair of apical spines and usually with a single additional spine. *Bulbus* (Figs. 28, 29): tegulum wider than distal division. Apical part of distal division with relatively large, parallel finger-like lateral sheet apophysis. *Vulva* (Fig. 30): spermatheca straight, lateral parts almost as thick as medial part. Dorsal arch slightly wider than long. Ventral wall of copulatory bursa with paired, large, parallel chitinized bands. For detailed description see Deeleman-Reinhold & Deeleman (1988).

Remarks.—Miller (1971) erroneously attributed this species to *D. longirostris*. Among his papers, we found unpublished drawings of the same specimen in different views that enabled us to determine these specimens unambiguously as *D. hungarica*.

Karyotype.—The male karyotype is composed of eight pairs of autosomes and a single sex chromosome (Fig. 20). Analysis of male

meiotic division confirmed an XO sex chromosome system.

Habitat.—Sexual populations occur in xerothermic forests (*Quercus* spp., *Carpinus betulus*, monocultures) on bed-rocks rich in minerals. It also occurs on semirural habitats around old ruins of buildings, such as castle ruins overgrown by bushes. We noted considerable ecological plasticity of parthenogenetic clones. They occur in the same habitats as sexual populations, especially semirural woods and bushes, often with liana *Hedera helix* on the ground, and often within cities. Moreover they can occur on aforested habitats, such as wetlands with *Phragmites australis*, salt marshes, wet meadows, agroecosystems (orchards, vineyards). Low abundances are characteristic for the clones in such habitats.

Phenology.—Similar to *D. ninnii*.

Distribution.—Distribution of the nominate subspecies stretches from the Caucasus and Crimea to the Balkan Peninsula (Romania, Bulgaria) and central Europe (Hungary, Czech Republic, Slovakia, Austria). It reaches as far south as Bulgaria and Yugoslavia, and as far north as the Czech Republic and Slovakia. The subspecies *D. hungarica subalpina* is known from north Caucasus (North Ossetia); *D. hungarica atra* from Georgia and Azerbaijan (Dunin 1992). Moreover, geographic parthenogenesis is present in this species (Deeleman-Reinhold 1986; Gruber 1990). In the eastern part of the distribution only sexual populations are found, while in the western part only thelytokous clones occur. The clones are characterized by isolated localities (e.g., Prague-Ruzyně). The transient zone between sexual and thelytokous forms runs through Slovakia and Hungary, specifically through Rimavská Sobota and Eger. Due to the fact that determination of members of the genus *Dysdera* is usually based on the morphology of the male copulatory organ, *D. hungarica* is largely overlooked in the western part of its distribution.

Distribution maps were published by Deeelman-Reinhold & Deeleman (1988: map 4), Deeleman-Reinhold (1986: 27, only for the central part of the distribution area, with distinguished sexual populations and parthenogenetic clones), Řezáč & Bryja (2002: fig. 3, for the Czech Republic), Buchar & Růžička (2002: 205, for the Czech Republic), Deltšev et al. (2003: map 17, for Serbia), and Gajdoš et al. (1999: map 180, for Slovakia).

Dysdera adriatica Kulczyński 1897

Figs. 21, 31–34

Dysdera hungarica var. *adriatica* Kulczyński, in Chyzer & Kulczyński 1897:270.

Dysdera adriatica: Deeleman-Reinhold & Dee-
leman 1988:170, figs. 66–72; Thaler & Kno-
flach 2002:417, figs. 1–2, 4.

Type specimens.—*Dysdera adriatica*: syn-
types: CROATIA: 1 male, 1 female, 2 juveniles,
Orehovica (45°19'N, 14°28'E), north Dalmatia,
C. Chyzer (HNHM, examined); unknown
number of adult specimens, Bakarac
(45°17'N, 14°34'E), Martinšćina (=Martin-
scizza) (46°08'N, 16°03'E), Vrata (45°18'N,
14°43'E), Risnjak (45°25'N, 14°37'E) (reposi-
tory unknown, not examined).

Material examined.—BULGARIA: 4 ♀, Baj-
kal near Izvor, Kiustendil area [42°26'N,
22°52'E], 8 August 2005, M. Řezáč (MR).
CROATIA: 1 ♂, 12 ♀, Plitvička jezera lakes,
Korana [44°54'N, 15°36'E], 22 June 2005, M.
Řezáč (MR). SLOVENIA: 1 ♀, Ig. Kremenški
gozd [45°56'N, 14°33'E], 7 June 1997, S. Brelih
(UL); 7 ♂♂ ♀, Slavnik, V. Gobovica [45°33'N,
13°58'E], 7–8 September 1996, M. Kuntner (UL);
2 ♀, Podgorje, Slavnik hill [45°31'N, 13°57'E], 26
July 1996, M. Kuntner (UL); 1 ♂, 1 ♀, Dolina
Kolpe, Slavski Laz [45°29'N, 14°54'E], 29 April
2001, S. Brelih (UL); 1 ♀, Grahovo [45°46'N,
14°26'E], 6 November 1992, S. Brelih (UL). *Novo*
Mesto area: 1 juvenile, Čatež near Trebnje
[45°57'N, 14°57'E], 28 June 1997, M. Kuntner
(UL); 1 ♀, Pleš hill near Semič [45°39'N, 15°10'E],
27 July 2001 (UL). *Lipica* area: 5 ♀, 1 juvenile,
Glavica, 2 km S of Kozina [45°36'N, 13°56'E], 26
July 1996, 7 September 1996, M. Kuntner (UL).
Ljubljana area: 1 juvenile, Ljubljana, Rašila
[46°03'N, 14°30'E], July 1994, M. Jernejc (UL);
1 ♂, Rašica [45°51'N, 14°37'E], 7 April 1995, M.
Kuntner (UL); 1 juvenile, Brkini, Javorje
[46°13'N, 14°28'E], 25 July 1996, M. Kuntner
(UL); 1 ♀, Borovnica, Pekel [45°55'N, 14°21'E],
September 1996, J. Mazi (UL); 13 ♂, 5 ♀, 2
juveniles, Ljubljana, Ljubljanski vrh hill, 3 km S
of Vrhnik [45°56'N, 14°17'E], 2–23 May 1996, 23
May–13 June 1996, 13 June–4 July 1996, 23 July–
21 August 1996, 21 August–15 September 1996,
M. Kuntner (UL). *Maribor* area: 1 juvenile,
Maribor, Zgornji Duplek [46°30'N, 15°43'E],
June–July 1991 (UL). *Postojna* area: 6 ♀, 1
juvenile, Planinsko polje plain [45°50'N,
14°14'E], May 1982, June 1983, 8 June 1984
(UL); 2 ♂, 3 ♀, 1 juvenile, Laze near Planinsko

polje plain [45°51'N, 14°15'E], 17 July–21 August
1994, 21 September–16 October 1994, 16 Octo-
ber–21 November 1994, March–1 May 1995, M.
Kuntner (UL); 1 ♂, June 1997, A. Gregorčič (UL);
2 ♂, 4 ♀, Razdrto [45°45'N, 14°03'E], 14 June 1957
(NMPC); 2 ♀, Planina, Unška koliševka chasm
[45°50'N, 14°14'E], 2000, M. Řezáč (MR).
Kočevje area: 1 ♂, Mahovnik near Kočevje
[45°39'N, 14°50'E], 23 June 1930 (NMPC). *Ilirska*
Bistrica area: 1 juvenile, Koritnice, Milanja
[45°37'N, 14°16'E], 23 May 2003, S. Polak
(UL); 10 ♂, 1 ♀, Koritnice, Cerje [45°37'N,
14°16'E], 1 ♂, 14 May 1994, 28 June 1994, S.
Polak (UL); 4 ♂, 4 ♀, 1 juvenile, Koritnice
[45°37'N, 14°16'E], 7 May 1995, 14 June 1995,
12 July 1995, 26 July 1995, 14 August 1995, S.
Polak (UL); 1 ♂, Bač, Tuščak [45°38'N, 14°16'E],
4 April 1994, S. Polak (UL). *Krško* area: 1 ♀, 2
juveniles, Kozje [46°04'N, 15°33'E], 31 July, 1
August, 12 August 1999, G. Bergthaler (UL); 1 ♂,
same location, 13 August 1999, M. Šuštar (UL); 1
juvenile, Krško, Pečice [46°01'N, 15°34'E], 15
May 1992, S. Brelih (UL). *Celje* area: 1 ♀, 1
juvenile, Logaška planota, near Laška Kukava,
Senca [46°09'N, 15°14'E], 1–14 May 1995, 27
July–13 August 1995, M. Kuntner (UL). *Nova*
Gorica area: 1 ♂, 1 ♀, Nova Gorica, Panovec
[45°56'N, 13°39'E], 16 March 2001, S. Brelih
(UL). *Portorož* area: 2 juveniles, Koštabona,
Supot [45°29'N, 13°43'E], 24 May 1992, S. Brelih
(UL). *Julijske Alpe mountains*: 1 juvenile, Zato-
lmin, Tolminska korita [46°11'N, 13°43'E], 10
June 1997, S. Brelih (UL); 1 ♀, Kranjska Gora,
Vrščič [46°28'N, 13°46'E], June 1981 (UL); 1 ♂, 2
juveniles, Čepovan– Most na Soči [46°09'N,
13°43'E], 10 June 1997, S. Brelih (UL); 1 ♂,
Jesenice [46°26'N, 14°02'E], 20 September
(ZMHB). *Kranj* area: 1 ♀, Kranj, Šmarjetna gora
hill [46°14'N, 14°21'E], 30 June–8 July 1991, K.
Prosenc (UL); 1 ♀, Udin Boršt, Spodnje Duplje,
near Arnševa jama cave [46°17'N, 14°17'E], 1
August 1995, J. Kristanc (UL). YUGOSLAVIA:
1 juvenile, Vojvodina, Ruma [45°00'N, 19°49'E],
1 August 1976 (UL).

Diagnosis.—This species is very similar to *D.*
hungarica, from which it differs by the smaller
body, less smooth and more hairy carapace and
dorsal side of basal cheliceral segment; males
differ by the smaller and more protruding
finger-like lateral sheet apophysis; females
differ by the dorsal arch being remarkably
wider than long and by the paired chitinized
bands on the ventral wall of the copulatory
bursa being narrow and anteriorly convergent.

Description.—*Carapace* (Fig. 31): carapace 2.3–3.4 mm long, slightly wrinkled, ferruginous, dorsoventrally flat. Lateral margins of cephalic part convergent. *Chelicerae* (Fig. 31): basal segment elongated (basal segment length/carapace length = 0.58). Inner margin of basal segment straight, dorsal side convex, with relatively dense small hairy pits. Groove elongated (length of groove/basal segment length = 0.72), with three small teeth in basal half. Median cheliceral tooth > distal cheliceral tooth > basal cheliceral tooth. Median cheliceral tooth close to basal cheliceral tooth. Fangs elongated (fang length/carapace length = 0.50), thorn-shaped. *Legs*: femora spineless. Tibiae III–IV dorsally spineless, ventrally with a pair of apical spines and usually with 1–3 additional spines. *Bulbus* (Figs. 32, 33): tegulum wider than distal division. Apical part of distal division with protruding finger-like lateral sheet apophysis. *Vulva* (Fig. 34): Medial part of spermatheca thicker than lateral parts. Dorsal arch wider than long. Ventral wall of copulatory bursa with paired, narrow, anteriorly convergent chitinized bands. For detailed description see Deeleman-Reinhold & Deeleman (1988).

Karyotype.—The karyotype of the sole male examined consists of 20 chromosomes (Fig. 21). Analysis of male meiotic division revealed a sex chromosome system of X0. Moreover, one large and two small autosomes form a trivalent during meiosis (Fig. 43).

Habitat.—*Dysdera adriatica* occurs in various xerothermic forests and shrubland, mainly with dominant *Carpinus betulus*, *Fagus sylvatica*, *Quercus cerris* or *Pinus nigra*.

Phenology.—Similar to that of *D. ninnii*.

Distribution.—This species occurs in the northwestern regions of the Balkan Peninsula (together with *D. ninnii* it is the most common species in Slovenia and north-western Croatia) and in the Austrian southern Alps. Since *D. adriatica* occurs in westernmost Slovenia and southernmost Austria, it is expected to also occur in northeastern Italy. Distribution maps have been published by Deeleman-Reinhold & Deeleman (1988: map 5), and Deltshv et al. (2003: map 14, only for Serbia).

Dysdera longirostris Doblika 1853

Figs. 22, 35–38

Dysdera longirostris Doblika 1853:122; Chyzer & Kulczyński 1897:218, plate 10, fig. 43; Charitonov 1956:25, fig. 11; Oltean

1962:578, fig. 2; Loksa 1969:77, figs. 53D–E, 54C; Deeleman-Reinhold & Deeleman 1988:167, figs. 51–56; Heimer & Nentwig 1991:46, fig. 97; Thaler & Knoflach 2002:418, figs. 3, 5.

Dysdera longitarsis [sic]: Herman 1879:206–207.

Type specimens.—*Dysdera longirostris*: syntypes: UKRAINE: unknown number of males and females, Crimea (perhaps NMW, not examined).

Material examined.—BULGARIA: 2 juveniles, Rîlski manastir monastery [42°07'N, 23°20'E], 4 August 2005, M. Řezáč (MR); 2 ♀, Kranevo near Zlatni piasaci, Varna area [43°20'N, 28°03'E], 10 August 2005, M. Řezáč (MR); 1 ♀, Albena, Varna area [43°14'N, 28°01'E], 9 August 2005, M. Řezáč (MR); 1 ♂, Vračanski Balkan, Vratsa, Čelopeč [43°09'N, 23°27'E], 8 June 1957 (NMPC). GREECE: 1 ♂, 1 ♀, Leptokaria [40°03'N, 22°33'E], 4 June–13 June 1996, J. Dolanský (MR). HUNGARY: 1 ♀, Buda, Viranyi utca [47°30'N, 19°01'E], G. Kolosváry (HNHM); 1 ♀, Misina hill above Pécs [46°07'N, 18°12'E], 11 July 1951, Somfai (HNHM); 1 ♂, 1 ♀, same location, 30 September 2006, M. Řezáč (MR); 1 juvenile, Kölked near Mohács [45°56'N, 18°42'E], 29 September 2006, M. Řezáč (MR). MACEDONIA: 1 ♀, Šar planina [41°48'N, 20°41'E], 12 June 1974, Hladík (NMPC). TURKEY: 1 ♂, Bolu province, Düzce, Üç Köprü [40°47'N, 31°14'E], 2 May 2004, M. Horsák (MR). UKRAINE: *Crimea*: 1 ♂, 2 ♀, Cherson Taurica [44°42'N, 34°01'E] (NHRS); 3 ♂, 1 ♀, Yalta area, 1 km N of Nikitskaja School [44°29'N, 34°09'E], 3–11 June 2000, N. Kovblyuk (MR); 2 ♂, Simferopol district, 3 km NW of Skvortsovo [45°04'N, 33°48'E], 30 June–10 July 2002, N. Kovblyuk (MR). YUGOSLAVIA: 1 ♂, Belgrade [44°47'N, 20°28'E] (NMPC).

Diagnosis.—*Dysdera longirostris* is very similar to *D. hattusas* Deeleman-Reinhold 1988, a species endemic to northern Turkey. Among central European species it is characterized by the extremely elongated chelicerae. From *D. hungarica* and *D. adriatica*, the males can be further distinguished by the slender tegulum, and the medially curved finger-like lateral sheet apophysis; the females by the high, distally situated spermatheca, and by the distinct arcuate dorsal arch with the posterior extremities remarkably curved laterally.

Description.—*Carapace* (Fig. 35): carapace 3.0–3.8 mm long, wrinkled, shiny, dark brown

to ferruginous, remarkably dorsoventrally flat. Lateral margins of cephalic part convergent. *Chelicerae* (Fig. 35): basal segment very elongated (basal segment length/carapace length = 0.67). Inner margin straight, dorsal side convex, slightly wrinkled, shiny, with sparse, small hairy pits. Groove very elongated (length of groove/basal segment length = 0.87), with three small teeth in basal quarter. Median cheliceral tooth > distal cheliceral tooth > basal cheliceral tooth. Teeth equally distant. Fangs very elongated (fang length/carapace length = 0.77), thorn-shaped. *Abdomen*: in males, book lung opercula and margins of spiracles heavily sclerotized. *Legs*: femora spineless. Tibiae III–IV dorsally spineless, ventrally with a pair of apical spines and usually with 1–2 additional spines. *Bulbus* (Figs. 36, 37): tegulum slightly wider than distal division. Apical part of distal division with relatively long, medially curved finger-like lateral sheet apophysis. *Vulva* (Fig. 38): spermatheca high, in respect to dorsal arch distally situated. Dorsal arch distinctly arcuate, with posterior extremities curved laterally. For detailed description see Deeleman-Reinhold & Deeleman (1988).

Karyotype.—The male karyotype is composed of 40 chromosomes (Fig. 22). The sex chromosome system is uncertain.

Habitat.—*Dysdera longirostris* occurs in various xerothermic forests and shrublands, often semirural ones, mainly with dominant *Carpinus betulus*, *Fagus sylvatica*, *Quercus* sp., or *Pinus* sp.

Phenology.—Similar to that of *D. ninnii*.

Distribution.—This species occurs in the Balkan Peninsula, northwestern Turkey, and Crimea. The northern border of its distribution runs through north Hungary and Romania. All records from Slovakia (Gajdoš et al. 1999: map 190) are erroneous. However, its occurrence in the warmest parts of southern Slovakia, especially in the surroundings of Slovenské Nové Mesto, is possible. Distribution maps have been published by Deeleman-Reinhold & Deeleman (1988: 258, map 2), and Deltshv et al. (2003: 250, map 18, for Serbia).

Dysdera lata species-group

Remarks.—This species-group was first recognized by Deeleman-Reinhold (1988). In central Europe, the *lata* group is represented by a single species, *D. taurica*.

Dysdera taurica Charitonov 1956

Figs. 23, 39–42

Dysdera taurica Charitonov 1956:36, fig. 10; Tyschenko 1971:71, fig. 103; Deeleman-Reinhold & Deeleman 1988:208, figs. 208, 215; Heimer & Nentwig 1991:44, fig. 93.

Dysdera westringi Pickard-Cambridge: Herman 1879:205–206; Chyzer & Kulczyński 1897: 267, plate 10, fig. 39; Loksa 1969:75, figs. 52A–B; Drensky 1938:92, fig. 8b (doubtful identification).

Type specimens.—*Dysdera taurica*: syntypes: UKRAINE: 1 male, 1 female, Kekeneiz (44°24'N, 33°55'E), Crimea, 1927 (repository unknown, not examined); 1 male, 1 female, Crimea, 1947, D.M. Fedotov (repository unknown, not examined).

Material examined.—BULGARIA: 3 juveniles, Kranevo near Zlatni piasaci, Varna area [43°19'N, 28°02'E], 10 August 2005, M. Řezáč (MR). HUNGARY: 2 ♂, 1 ♀, Buda, Virányi u. [47°30'N, 19°01'E], G. Kolosváry (HNHM). ROMANIA: 1 ♂, Transylvania, Zickeli (BMNH). TURKEY: 1 ♀, Konya province, Akşehir district, Ortaköy [38°27'N, 31°31'E], 13 May 2005, T. Türket (MR); 1 ♀, Niğde province, Gümüşler town [37°59'N, 34°46'E], 4 June 2002, H. Demir (MR); 1 ♂, 1 ♀, Niğde province, Alihoca [37°29'N, 34°41'E], 18 June 2002, H. Demir (MR).

Diagnosis.—*Dysdera taurica* is the only central European *Dysdera* species possessing dorsal spines on tibiae III and IV and one of two species (with *D. lantosguensis*) possessing a concave mediodorsal margin of the basal cheliceral segment. It is very similar to members of the *lata* group, especially *D. westringi* Pickard-Cambridge 1872, *D. lata* Wider 1834 and *D. spinicrus* Simon 1882, which are restricted to the Mediterranean region, mainly the Near East. From these species the males of *D. taurica* are recognized by presence of three teeth on the apical lobe (crest) of the bulbus, and the females by the shape of the dorsal arch of the anterior diverticulum.

Description.—*Carapace* (Fig. 39): carapace 3.4–5.9 mm long, strongly wrinkled/foveated, dark brown-red to ferruginous, gibbous. Lateral margins of cephalic part parallel. *Chelicerae* (Fig. 39): basal segment slightly elongated (basal segment length/carapace length = 0.40). Dorsal side and inner margin concave, smooth, covered with dense, short hairs and several long

hairs. Groove elongated (length of groove/basal segment length = 0.52), with three small teeth in basal half. Basal cheliceral tooth > median cheliceral tooth > distal cheliceral tooth. Teeth equally distant. Fangs elongated (fang length/carapace length = 0.34), thorn-shaped. *Legs*: femora I–II spineless, femora III usually with 1, femora IV are usually with 5–6 dorsal spines. Tibiae III–IV dorsally with 1 or more spines, ventrally with a pair of apical spines and usually with 2–4 additional spines. *Bulbus* (Figs. 40, 41): tegulum long, distal part contracted. Distal division apically with a lateral lobe and a spine. Lateral lobe with three ridge-like teeth. *Vulva* (Fig. 42): spermatheca thin, the extremities dilated. Dorsal arch wider than high. For detailed description see Deeleman-Reinhold & Deeleman (1988).

Remarks.—*Dysdera taurica* has, for a long time, been identified as *D. westringi* in central Europe, but Deeleman-Reinhold & Deeleman (1988) demonstrated that *D. westringi* is in fact restricted to the eastern Mediterranean region. Central European populations belong to *D. taurica*, which was originally described from Crimea. A drawing labeled *D. westringi* in Drensky (1938) is perhaps a compilation of a figure of *D. taurica* from Chyzer & Kulczyński (1897) and a figure of *D. lata* from Simon (1914).

Karyotype.—The male karyotype is composed of 11 pairs of autosomes and a single sex chromosome (Fig. 23). Study of male meiotic plates confirmed that the sex chromosome system is X0.

Habitat.—*Dysdera taurica* occurs in xerothermic *Quercus* and *Caprinus* forests and its fringes.

Phenology.—Similar to that of *D. ninnii*.

Distribution.—This species occurs in the Balkan Peninsula, Turkey, Crimea, and on islands in the Aegean Sea. The northern border of its distribution runs through Romania, north Hungary and south Slovakia, where it occurs only in the warm limestone area of Slovak Karst. A distribution map has been published by Deeleman-Reinhold & Deeleman (1988: 264, map 14). The maps of *D. westringi* in Gajdoš et al. (1999: map 220) and in Deltchev et al. (2003: 252, map 20) actually refer to this species.

Dysdera erythrina species-group

Remarks.—This species-group was first recognized by Deeleman-Reinhold (1988). Two

closely related species of this group, *D. erythrina* and *D. lantosquensis*, occur in central Europe. A more detailed study on this group is presented by Řezáč et al. (unpubl. ms.). In this contribution, we provide a list of material examined and a diagnosis.

Dysdera erythrina (Walckenaer 1802)

Material examined.—CZECH REPUBLIC: *Doupovské hory mountains*: 1 juvenile, Kadaň, reserve Úhošť [50°21'N, 13°11'E], 20 August 2004, M. Řezáč (MR). *Prague*: 3 ♂, 3 ♀, reserve Lochkovský profil [49°58'N, 14°20'E], 25 May–16 June 1960, 26 May–10 June 1961, 6–19 August 1961, 2–21 September 1961, 14 October–4 November 1961, 9 April–4 May 1960, E. Žďárková (MR); 1 ♀, reserve Cikánka [49°59'N, 14°20'E], 25 April 2004, M. Řezáč (MR); 1 ♂, 1 juvenile, reserve Slavičí údolí [49°58'N, 14°20'E], 14 October 2002, J. Strejček (MR); 2 ♀, reserve Radotínské údolí [49°58'N, 14°19'E], 20 May 2004, 3 May 2005, M. Řezáč (MR); 2 ♀, reserve Prokopské údolí [50°02'N, 14°21'E], 1995, 10 June 2003, M. Řezáč (MR); 1 ♂, 4 ♀, same location, 23 October 1976, 8 September 1979, 2 October 1976, M. Antuš (MA); 1 ♀, Dalejské údolí valley [50°02'N, 14°20'E], 2003, M. Řezáč (MR); 2 ♀, reserve Šance [49°58'N, 14°24'E], 2 April 1999, 3 May 2004, M. Řezáč (MR); 1 ♀, reserve Kalvárie [50°04'N, 14°20'E], 2004, M. Řezáč (MR); 1 ♀, Karlov [50°04'N, 14°25'E], 2004, M. Řezáč (MR); 1 ♂, Žižkov, Vítkov hill [50°05'N, 14°27'E], 18 May 1976, M. Antuš (MA); 1 ♀, Klánovice [50°04'N, 14°39'E], 28 April–10 June 2001, Š. Tábořská (MR); 1 ♀, reserve Opukový lom [50°07'N, 14°17'E], 21 April 1982, J. Buchar (NMPC); 2 ♂, 4 ♀, reserve Baba [50°07'N, 14°23'E], 1 November 1978, 15 May 1979, 6 May 1979, 24 October 1979, A. Kůrka (NMPC); 2 ♂, reserve Sedlecké skály [50°08'N, 14°23'E], 23 May 1986, 18 July 1986, A. Kůrka (NMPC); 1 ♀, reserve Obora Hvězda [50°04'N, 14°19'E], 2003, M. Řezáč (MR); 3 ♂, reserve Královská obora [50°06'N, 14°25'E], 4 April 2001, J. Strejček (MR); 1 ♂, Ruzyně [50°05'N, 14°17'E], 2 July 1993, Zavoralová (NMPC); 1 ♂, 1 ♀, 1 juvenile, same location, autumn 2002, M. Řezáč (MR); 2 ♂, 1 ♀, reserve Tiché údolí, Sluneční stráň [50°09'N, 14°23'E], 16 July 1980, 4 June 1981, 2 October 1981, A. Kůrka (NMPC); 1 ♀, reserve Tiché údolí, Holý vrch hill [50°09'N, 14°22'E], 20 September 1980, A. Kůrka (NMPC); 1 juvenile, reserve

Tiché údolí, Roztocký háj [50°08'N, 14°23'E], 30 August 2003, M. Řezáč (MR). *Český kras area*: 1 ♂, Choteč, Škrábek hill [49°58'N, 14°16'E], 6 May 1959, J. Buchar (NMPC); 1 ♀, Srbsko, reserve Koda [49°55'N, 14°07'E], 6 May 1959, J. Buchar (NMPC); 1 juvenile, same location, 3 September 2003, M. Řezáč (MR); 1 ♀, 1 juvenile, Suchomasty, reserve Lom na Kobyle [49°54'N, 14°02'E], 16 June 1995, A. Kůrka (NMPC); 1 ♀, Svatý Jan pod Skalou, reserve Karlštejn [49°57'N, 14°08'E], 2003, M. Řezáč (MR); 1 ♀, Mořina, Velká Amerika quarry [49°57'N, 14°14'E], 2003, M. Řezáč (MR); 2 juveniles, Koněprusy, Čertovy schody quarry [49°55'N, 14°03'E], 8 September 1994, A. Kůrka (NMPC); 1 ♀, Koněprusy, reserve Kotýz [49°55'N, 14°03'E], 15 April 2000, M. Řezáč (MR); 1 ♂, 1 ♀, Beroun, Merhantova skála rock [49°58'N, 14°04'E], 17 June 2004, P. Špryňar (MR); 1 ♂, Suchomasty, reserve Na Voskopě [49°54'N, 14°02'E], 2 June 1999, A. Kůrka (NMPC); 1 ♂, same location, 3 August 2000, V. Pflieger (NMPC); 1 ♀, 1 juvenile, Suchomasty, Újezdce hill [49°54'N, 14°02'E], 30 July 2001, M. Řezáč (MR); 2 ♂, same location, 23 September 2001, J. Strejček (MR); 1 ♀, Karlštejn [49°56'N, 14°10'E], 6 November 1998, M. Řezáč (MR); 2 ♂, 1 ♀, 1 juvenile, Srbsko, reserve Karlštejn, Komárkova lesostep [49°56'N, 14°09'E], 3 May–30 June 1965, J. Buchar (NMPC); 1 ♂, 1 ♀, same location, 12 May 2000, 9 June 2001, M. Řezáč (MR); 4 ♀, same location, 1 August 2000, 3 October 2001, 28 October 2001, L. Kubcová (LK). *České středohoří mountains*: 1 ♂, Ústí nad Labem, Koštov [50°38'N, 13°59'E], 27 September–23 October 1995, J. Hajer (VR); 1 ♂, Ústí nad Labem, Opárenské údolí valley [50°37'N, 14°05'E], 18 June 1978, M. Antuš (MA); 1 ♂, Ústí nad Labem, Klíše, Střížovický vrch hill [50°39'N, 10°00'E], 18 April–8 May 2002, V. Hula (VH); 1 ♂, Měrunice [50°29'N, 13°48'E], 19 May 1977, A. Kůrka (NMPC); Chraberce, reserve Oblík [50°25'N, 13°49'E], 4 August 1999, M. Řezáč (MR). *Rakovnicko area*: 2 ♀, 2 juveniles, Rakovník [50°06'N, 13°43'E], 1941, F. Miller (NMPC); 1 ♀, Křivoklát [50°02'N, 13°51'E], 1941, F. Miller (NMPC); 1 ♀, Lišany [50°08'N, 13°43'E], 1941, F. Miller (NMPC). *Střední Povltaví area*: 1 ♀, Nalžovické Podhájí, reserve Drbákov-Albertovy skály [49°44'N, 14°22'E], 28 June 1991, V. Růžička (VR); 1 ♂, 2 ♀, 1 juvenile, Rabyň, Vltava valley [49°49'N, 14°25'E], 6 October 1996, 29 July 1999, M.

Řezáč (MR). GERMANY: 1 ♂, 2 ♀, Hamburg [53°36'N, 10°02'E] (ZMHB); 1 ♀, 1 juvenile, Muggendorf am Nordhange [49°48'N, 11°15'E], 2 August 1908, F. Dahl (ZMHB); 1 ♂, 1 ♀, Pommelsbrunn near Nürnberg, [49°30'N, 11°30'E], 16 April 1905, F. Dahl (ZMHB); 1 ♀, Geroldsgrün [50°20'N, 11°35'E], 11 May 1905, F. Dahl (ZMHB); 2 ♂, 3 juveniles, Münster, Rothenfels an der Nahe [51°57'N, 7°38'E], 25 October 1916, F. Dahl (ZMHB); 1 ♀, 1 juvenile, Staffelstein [50°05'N, 10°58'E], 7 October 1920, F. Dahl (ZMHB); 1 ♀, Schlangenbad, Georgenborner Wand [50°05'N, 8°06'E], 27 October 1916, F. Dahl (ZMHB); 1 ♀, Doulen, Dona, 24 September, K. Verhoeff (ZMHB); 1 ♀, Wadewitzgrund, 15 June, K. Verhoeff (ZMHB); 4 ♀, Landstuhl [49°24'N, 7°34'E], C. L. Koch (BMNH); 4 ♀, Grütz [52°40'N, 12°16'E], C.L. Koch (BMNH); many ♂ ♀, Fränkischer Jura, C.L. Koch (BMNH); 3 ♂, 1 ♀, same location, L. Koch (NMW); many ♂ ♀, Würzburg [49°47'N, 9°56'E], C.L. Koch (BMNH); 1 ♀, Freiburg im Breisgau [47°59'N, 7°50'E], C.L. Koch (BMNH); 1 ♂, 1 ♀, Hartmanshof [49°28'N, 11°34'E], C.L. Koch (BMNH); 1 ♀, unspecified location (BMNH). HUNGARY: 2 ♀, unspecified location, C. Chyzer (HNHM). SLOVAKIA: 1 ♂, Belanské Tatry [49°13'N, 20°09'E], 25 July 1957, J. Žďárek (MR).

Diagnosis.—*Dysdera erythrina* is very similar to several sibling species, so far considered subspecies of *D. erythrina* [see Platnick (2007)], which are, however, restricted to northeastern Spain and southern France. It differs from the second central European member of the *erythrina* group, *D. lantosquensis*, by the convex mediodorsal margin of the basal cheliceral segment and the less wrinkled and less gibbous carapace.

Dysdera lantosquensis Simon 1882

Material examined.—AUSTRIA: *Wachau area*: 1 ♀, Spitz an der Donau, north of Roten Tor, 15 June 1996, J. Gruber (NMW); *Hainburger Berge mountains*: 1 ♀, Holfsthal [48°07'N, 16°57'E], 24 May 1959, J. Gruber (NMW). *Burgenland area*: 1 ♀, southern Leithagebirge, 14 km ENE from Wimpassing, Gaibunhal [47°56'N, 16°35'E], 11 May–29 June 1969, J. Gruber (NMW); 1 ♀, Leithagebirge, Grenzweg, Kaisereiche [47°53'N, 16°31'E], 28 June 1959, J. Gruber (NMW); 3 ♀, southern Leithagebirge, SE from Wimpassing, Lebzelter

- Bg. [47°53'N, 16°28'E], 4 July 1959, J. Gruber (NMW); 1 ♀, Leithagebirge, Zeilerberg [47°55'N, 16°36'E], 17 May 1959, J. Gruber (NMW); 1 ♂, 1 ♀, Wulkaniederung, Osliper Meierhof [47°49'N, 16°36'E], 29 April 1964, J. Gruber (NMW); 1 ♀, southern Leithagebirge, Müllendorf [47°50'N, 16°27'E], 29 September 1958, J. Gruber (NMW). CZECH REPUBLIC: *Bohemia*: 2 ♂, Hradčany, reserve Báb [50°09'N, 15°16'E], 2 May–3 June 2002, J. Dolanský (JD); 1 ♀, Žehuň, reserve Žehuňský rybník [50°09'N, 15°18'E], 26 May 1961, J. Buchar (JS); 2 ♂, 1 ♀, Pardubice, Kunětická hora hill [50°04'N, 15°48'E], 4 May–18 June 1997, J. Dolanský (JD); 2 ♂, Žumberk [49°53'N, 15°52'E], 7 May 1996–10 July 1996, J. Dolanský (JD). *Moravia*: 1 ♀, Střelice near Brno, reserve Střelický les [49°08'N, 16°30'E], 28 April 1999, V. Bryja (VB); 1 ♀, Brno, Hádky [49°12'N, 16°39'E], 5 June, F. Miller (NMPC); 1 ♂, Dambořice [49°02'N, 16°56'E], 30 June 1967, F. Miller (NMPC); 1 ♂, 1 ♀, Blansko [49°20'N, 16°45'E], 15 May 1979, F. Miller (NMPC); 1 ♀, Vilémovice [49°22'N, 16°45'E], 28 September 2006, J. Vašítko (MR); 4 ♂, 2 ♀, 1 juvenile, Drslavice, reserve Terasy [49°03'N, 17°35'E], 2 June 2005, 8 August 2005, 15 September 2005, Z. Majkus (ZM); 1 ♀, Teplice nad Bečvou, near Zbrašovské aragonitové jeskyně caves [49°31'N, 17°36'E], 21 April–31 May 2004, K. Tajovský (MR); 1 ♀, Hradčovice, reserve Rovná hora [49°03'N, 17°35'E], 15 September 2005 (ZM); 1 ♀, Bruntál, reserve Ptačí hora [49°59'N, 17°27'E], 19 May 1998, Z. Majkus (JS); 2 ♂, 1 ♀, Bučovice, reserve Malhotky [49°09'N, 17°00'E], 26 June 2004, 5 September 2004, V. Hula (MR); 1 ♂, Mohelno, reserve Hadcová step [48°56'N, 16°38'E], 1983, F. Miller (NMPC); 1 ♂, same location, 10 May 1995, J. Buchar (NMPC); 1 ♀, Pouzdřany, reserve Pouzdřanská step-Kolby [48°56'N, 16°38'E], 25 October 1967, F. Miller (NMPC); 2 ♂, 2 ♀, same location, 16 May–12 June 2004, 22 May–12 June 2005, S. Vinkler (VB); 1 ♀, Horní Věstonice, reserve Děvín-Kotel-Soutěska [48°52'N, 16°38'E], 15 June 1956, F. Miller (NMPC); 1 ♂, same location, 26 October 1992–14 May 1994, V. Růžička (VR); 1 ♂, 1 ♀, same location, 2 August 2003, V. Bryja (MR). HUNGARY: 1 ♂, Miskolcz, Also-Hámor [48°05'N, 20°40'E], July 1873, O. Herman (HNHM); 2 ♂, 11 ♀, Balatonfüred, northern part of Tihany peninsula [46°55'N, 17°52'E], 28 September 2006, M. Řezáč (MR); 1 ♀, Mísina hill above Pécs [46°06'N, 18°13'E], 30 September 2006, M. Řezáč (MR). SLOVAKIA: *Beskydské predhorie mountains*: 1 juvenile, Brekov [48°53'N, 21°49'E], 14 June–15 August 2000, V. Thomka (VMH). *Biele Karpaty mountains*: 3 ♂, 1 ♀, Dolná Súča, reserve Krasín [48°57'N, 18°01'E], 6 April–11 October 1989, May–11 October 1989, P. Devan (PG). *Burda mountains*: 2 ♂, 1 ♀, Chlaba, Kováčov [47°50'N, 18°46'E], 8 August 1986, 9 August 1986, P. Gajdoš (PG); 21 ♂, 16 ♀ juveniles, Chlaba [47°49'N, 18°49'E], 14 August–26 October 1978, 6 May–20 June 1977, 12 September–1 November 1977, 1 June 1977–18 July 1978, 12 April–23 May 1977, 20 June–18 July 1977, 6 May–1 June 1977, March–12 April 1977, 12 April–6 May 1977, 12 September–2 October 1977, 22 August–12 September 1977, V. Petřivalský (PG). *Čergov mountains*: 1 ♂, 2 ♀, Hradisko [49°08'N, 21°13'E], 26 May 1936, F. Miller (NMPC). *Hornonitrianska kotlina basin*: 1 ♀, Zemianske Kostolany [48°41'N, 18°32'E], 14 May 1975 (PG). *Hronská pahorkatina (hilly country)*: 1 ♀, Štúrovo [47°47'N, 18°43'E], 18 June 1964, J. Buchar (NMPC). *Kremnické vrchy mountains*: 1 ♂, 2 ♀, Budča, reserve Boky [48°34'N, 19°04'E], 1975, 1976, V. Thomka (VMH). *Malá Fatra mountains*: 1 ♂, Nezbudská Lúčka, reserve Starhrad [49°10'N, 18°51'E], F. Miller (NMPC); 1 ♀, same location, 6 May 1973, J. Svatoň (JS); 1 ♀, Strečno [49°10'N, 18°51'E], 11 May 1936, F. Miller (NMPC). *Malé Karpaty mountains*: 2 ♂, 1 juvenile, Stupava, Vrchná hora hill [48°16'N, 17°01'E], 30 April–23 May 1999, 23 May–19 June 1999, 19 June–17 July 1999, O. Majzlan (PG); 1 ♂, 2 ♀, Bratislava, reserve Devínska Kobyla [48°10'N, 17°00'E], 21 May, 21 June, F. Miller (NMPC); 1 ♂, 2 ♀, same location, 7 May 1975, 10 November 1978, O. Žitňanská (JS); 2 ♀, 2 juveniles, same location, 10 May–8 June 1979, 5 July–26 September 1979, 5 September 1980, P. Gajdoš (PG). *Myjavská pahorkatina (hilly country)*: 1 ♀, Brezová pod Bradlom [48°39'N, 17°32'E], 9 June 1973, J. Vachold (PG). *Nitrianska pahorkatina (hilly country)*: 2 ♂, 2 ♀, Veľký Báb, reserve Veľký Báb [48°19'N, 17°52'E], 10 May 1973, O. Žitňanská (JS). *Považské podolie*: 1 ♂, Trenčianské Bohuslavice, reserve Turecký vrch [48°47'N, 17°52'E], May–16 July 1985, P. Devan (PG). *Považský Inovec mountains*: 1 juvenile, Lúka, ruins of the castle Tematín [48°39'N, 17°52'E], 1 July 1985, P. Gajdoš

(PG); 1 ♀, Beckov, Beckovské Skalice, Dubový vršek hill [48°47'N, 17°53'E], May–16 July 1985, P. Devan (PG). *Revúcka vrchovina mountains*: 1 ♂, Sirk, Valašská dolina valley [48°37'N, 20°05'E], 23 September–17 October 1987, I. Mihál (JS); 1 ♂, 1 ♀, Sirk, Pod Ladislavou [48°37'N, 20°05'E], 3 June–10 July 1987, I. Mihál (JS); 1 juvenile, Sirk, Čierna dolina [48°37'N, 20°05'E], 27 August–23 September 1987, I. Mihál (JS). *Slovenský kras area—Plešivecká planina plateau*: 1 ♂, Gočaltovo, Pod Železnými vratami [48°37'N, 20°20'E], 13 June 1983, J. Svatoň (JS); 1 ♂, Vidová, Teplá stráň [48°34'N, 20°25'E], 12 June 1983, J. Svatoň (JS); 1 ♀, Plešivec, Velký vrch hill [48°34'N, 20°24'E], 25 June 1984, J. Svatoň (JS). *Slovenský kras area—Silická planina plateau*: 1 ♂, 1 ♀, Kečovo, Dmica [48°30'N, 20°27'E], 15 May, F. Miller (NMPC); 2 ♀, 2 juveniles, same location, 22 August–8 October 2003, P. Gajdoš (PG); 1 ♀, Hrušov nad Turnou, Hradisko hill [48°35'N, 20°36'E], 19 August 2003, M. Řezáč (MR); 1 ♂, Hrušov nad Turnou, reserve Hrušovská lesostep [48°35'N, 20°36'E], 28 June 1984, J. Svatoň (JS); 1 ♂, 2 ♀, Jablonov, Hradište hill [48°36'N, 20°39'E], 16 October 1984, 24 July 1984, 16 October 1984, J. Svatoň (JS). *Spišsko-šarišské medzihorie mountains*: 1 ♀, 1 juvenile, Kapušany, reserve Kapušianský hradný vrch [49°02'N, 21°20'E], 20 June–30 August 1996, 31 July–9 October 1997, V. Thomka (VMH). *Štiavnické vrchy mountains*: 1 ♂, Počúvadlo, reserve Holík [48°21'N, 18°50'E], 13 May–17 July 1985, P. Gajdoš (PG); 1 juvenile, Tlmače, Krivín [48°16'N, 18°31'E], 4 July 1990, P. Gajdoš (PG). *Strážovské vrchy mountains*: 1 ♂, 1 ♀, Malé Kršteňany, reserve Velký vrch [48°38'N, 18°25'E], 6 May–4 July 1984, 4 July–8 September 1984, P. Gajdoš (PG); 1 juvenile, Súlov-Hradná, reserve Súlovské skaly [49°09'N, 18°35'E], 3 July 1963, J. Vachold (PG); 1 juvenile, Bojnice, Kalvária hill [48°46'N, 18°34'E], 12 June 1991, S. Pekár (MR). *Tribeč mountains*: 1 ♀, 2 juveniles, Nitrianska Streda, reserve Hrdovická [48°31'N, 18°10'E], 31 July–9 October 1986, 30 April–6 June 1986, 6 June–31 July 1986, P. Gajdoš (PG); 1 ♂, 1 ♀, Solčany, Úkropová [48°32'N, 18°12'E], 30 April–6 June 1986, P. Gajdoš (PG); 1 ♂, 2 ♀, Solčany, reserve Solčiansky háj [48°32'N, 18°12'E], 26 August–24 November 1987, 6 June–21 July 1987, P. Gajdoš (PG); 1 juvenile, Nitra, reserve Zo-

borská lesostep [48°20'N, 18°05'E], 10 May–12 June 1978, P. Gajdoš (PG). *Turčianska kotlina basin*: 3 ♂, 1 ♀, Vrútky, Chrapovský potok stream valley [49°06'N, 18°54'E], 23 July 1987, 23 July 1987, J. Svatoň (JS). *Vtáčnik mountains*: 1 ♀, Bystričany, Bystričianska dolina valley [48°39'N, 18°30'E], 3 April 1998, O. Majzlan (PG). *Zemplínske vrchy mountains*: 3 ♀, Viničky [48°23'N, 21°44'E], 12 April 1983, P. Gajdoš (PG). *Žilinská kotlina basin*: 1 ♂, 2 ♀, Žilina [49°13'N, 18°44'E], 2 May 1936, 25 May 1936, F. Miller (NMPC). *Žitavská pahorkatina (hilly country)*: 9 ♂, 9 ♀, 1 juvenile, Nitrianské Hrnčiarovce, Malanta, way to Pohranice [48°19'N, 18°07'E], 5 May 1992, 11 June 1992, 11 June–15 July 1992, 25 August 1992, 25 August–29 September 1992, 12 November 1992, P. Gajdoš (PG).

Diagnosis.—*Dysdera lantosquensis* and *D. taurica* are the only central European *Dysdera* species possessing a concave mediodorsal margin of the basal cheliceral segment. In contrast to *D. taurica*, *D. lantosquensis* does not possess dorsal spines on tibiae III and IV.

DISCUSSION

Nomenclature.—The name *Aranea hombergi* Scopoli 1763 was regarded as a senior synonym of *D. ninnii* or *D. dubrovninnii*. However without access to the type material it is not possible to ascertain its exact identity. Therefore we suggest that the name *Aranea hombergi* be regarded as a nomen dubium (sensu International Commission on Zoological Nomenclature 2007). As the name *A. hombergi* was so far erroneously used for the common species of the genus *Harpactea*, the oldest synonym of this *Harpactea* species, *Harpactea latreillii* (Blackwall, 1832), should be used henceforward.

Distribution.—Nearly all species of *Dysdera* are restricted to the Palearctic region. Of the 241 species of *Dysdera* described so far, only *D. crocata* occurs outside the Palearctic region. The remaining four species (Platnick 2007) are either synonyms of *D. crocata* (the Australian *D. australiensis* and the American *D. magna*) or are misplaced in the family Dysderidae. *Dysdera solers* Walckenaer 1837, described from Colombia, possesses apically rounded gnathocoxae (Walckenaer 1837) which are never present in members of *Dysdera*. Other features mentioned by Walckenaer (1837) (e.g., the body length and orange coloration) possibly

correspond to a member of the family Caponiidae. The type material was not found in either the BMNH or MNHN. *Dysdera bicolor* Tatzanovski 1874, described from French Guyana, is only 2.5 mm long and possesses abdominal scuta (Tatzanovski 1874), which are never present in species of *Dysdera*, suggesting that it is a representative of the family Oonopidae, subfamily Gamasomorphinae. The type material was not found in either the Museum or Institute of Zoology in Warszawa or in the Museum of Natural History in Krakow. We can conclude that the genus, like all other members of the family, is originally endemic to the Palearctic region.

Patterns of distribution of *Dysdera* species in central Europe suggest limited migration abilities of these spiders. For example, *D. ninnii* is absent in the apparently climatically suitable but, by mountain range, isolated area of central Bohemia, Czech Republic. Representatives of the genus *Dysdera* are characterized by a long life and relatively low fecundity (cf. Cooke 1965). Thus they belong to K-selected species which do not undergo high-risk dispersal behaviors such as ballooning. Balloon dispersal has never been reported in *Dysdera* spiders, and they have never been recorded in aerial samples. For example, not a single specimen was captured among 10,000 spider specimens collected in Switzerland (Blandenier & Fürst 1998). A single ballooning dysderid recorded in Blandenier & Fürst (1998) turned out to be juvenile of *Harpactea* (Řezáč, unpublished). Nevertheless, *Dysdera* species are prone to passive accidental transport with human material due to their tendency to attach silken retreats to large objects lying on the ground. Chance dispersal by such transport is frequent among species with affinities for synanthropic habitats. The most extensive expansion of this type has been performed by *D. crocata*. Based on the distribution of its sister species, the autochthonous area of *D. crocata* is probably in the southern part of the Mediterranean, perhaps in northern Africa. Due to its adaptations to arid environments, it is able to survive a transport in dry conditions and to colonize relatively arid synanthropic habitats. Similar, yet less extensive, expansions to synanthropic habitats have also been recorded for several other species, namely *D. aculeata*, *D. lata*, *D. spinicrus*, *D. westringi* (Deeleman-Reinhold & Deeleman 1988), *D. kollari* (Gasparo 2004),

and *D. erythrina* (a single occurrence in Slovakia). Further expansions of these species can be expected in the future.

A special preadaptation for migration is parthenogenesis within *D. hungarica*. As each adult specimen can produce eggs, thelytokous reproduction is twice as fast as bisexual reproduction where half of the population is males. Moreover, new localities can be colonized more quickly as a single individual can give rise to a new clone (Suomalainen et al. 1987). Recent expansion of parthenogenetic clones is documented in isolated locations with anthropic habitats on the western edge of the distribution of *D. hungarica* (e.g., a commercial orchard in Prague).

Habitat requirements.—In central Europe, *Dysdera* species are characteristic of warm areas, where they occur mainly in xerothermic forests on bedrocks rich in minerals. This type of biotope seems to be common for the majority of *Dysdera* species even in the Mediterranean area, i.e., the speciation center of the genus (see Deeleman-Reinhold & Deeleman 1988). In contrast to the majority of species of other central European dysderid genera, *Harpactea* and *Dasumia* Thorell 1875, *Dysdera* species usually avoid distinctly dry microhabitats in forests. Central European *Dysdera* species also occur in semi-synanthropic habitats, e.g., in the vicinity of ruins overgrown by woody plants. We suggest that an affinity for human buildings and their surrounds may be the result of rich calcium in the building materials, allowing the proliferation of woodlice, the principal prey of *Dysdera* (Cooke 1965).

In areas frequented by *D. ninnii*, the closely related species *D. dubrovinnii* is concentrated in non-forest habitats which are unusual for *Dysdera* species. Although this hypothesis is untested, we suggest that this could be a consequence of competition between these two species. A similar phenomenon was recorded from the sympatric area of *D. erythrina* and *D. crocata* in England (Cooke 1967).

Unusual ecological plasticity was observed in parthenogenetic clones of *D. hungarica*. These clones were found even in anomalous non-forest habitats such as wetlands with *Phragmites australis*, salt marshes, wet meadows, or vineyards. Thelytoky may enable the clones to survive even in suboptimal habitats, which are,

however, not suitable to harbour the high abundance necessary for sexual reproduction.

Karyotype evolution.—The genus *Dysdera* exhibits the highest variation in chromosome number of all spider genera thus far studied (Král, unpublished data). Male diploid number ranges from 9 (*D. crocata*; Díaz & Sáez 1966; this study) to 40 (*D. longirostris*, this study). Such enormous variation, as well as an absence of karyotype data from other genera of the family, renders it difficult to determine the ancestral karyotype of the genus *Dysdera*. However, due to the fact that even closely related species differ in chromosome number (*D. ninnii*-*D. dubrovinnii*, *D. hungarica*-*D. adriatica*-*D. longirostris*, this study; *D. erythrina*-*D. lantosquensis*) (Řezáč et al. unpubl. ms.), karyotype appears to be a useful character for the taxonomy of the genus. The high variation in chromosome numbers may be related to the holocentric structure of the chromosomes. Holocentric chromosomes exhibit kinetochore along the major part of their length. Therefore, products of chromosome fissions (fragments) or fusions (fused chromosomes) often segregate regularly to the poles during division and are then more easily tolerated than in organisms with more common monocentric chromosomes (Jacobs 2004). The structure of meiotic trivalent found in *D. adriatica* suggests that the specimen studied was heterozygous for chromosome fusion or fission. This finding supports our hypothesis about the frequent occurrence of these rearrangements in karyotype evolution in the genus *Dysdera*. Concerning sex chromosomes, we confirmed a sex chromosome system of X0 in *D. crocata* previously found by Díaz & Sáez (1966), Benavente & Wettstein (1980), Benavente (1982) and Rodríguez Gil et al. (2002). In contrast to the considerable variability in chromosome numbers, most *Dysdera* species exhibit an X0 sex chromosome system with the X chromosome being the largest chromosome. However, even number of chromosomes in male mitoses of *D. longirostris* indicates another sex chromosome system than X0. The absence of meiotic plates made impossible determination of sex chromosome system in this species.

In *D. crocata*, we also detected interpopulation polymorphism in chromosome number. Males from various populations possessed four ($2n = 9$), five ($2n = 11$) or even six ($2n = 13$) pairs of autosomes. A similar range of variation in chromosome numbers also has been described in South American populations of *D.*

crocata. Nine chromosomes were recorded in the population called *D. magna* from Uruguay (Díaz & Sáez 1966) and 11 chromosomes in the population from Argentina (Rodríguez Gil et al. 2002). We suggest the ancestral male karyotype of *D. crocata* probably contained 13 chromosomes as this chromosome number was also found in the related species *D. gammarae* from the Iberian Peninsula (Král, unpublished). The considerable chromosome polymorphism found in *D. crocata* indicates differentiation of this species into chromosomal races or even the existence of cryptic species.

ACKNOWLEDGMENTS

We would like to express our thanks to the following colleagues who kindly provided us with the material: M. Antuš (Prague), J. Beccaloni (British Museum of Natural History, London), G. Blandenier (Museum of Natural History, La Chaux de Fonds), V. Bryja (Brno), J. Buchar (Kamenice), H. Demir (University of Nidde, Nidde), J. Dolanský (Eastern Bohemian Museum, Pardubice), P. Gajdoš (Institute of Landscape Ecology, Nitra), F. Gasparo (Trieste), J. Gruber (Museum of Natural History, Vienna), Ch. Hervé and Ch. Rollard (National Museum of Natural History, Paris), D. Hirst (South Australian Museum, Adelaide), V. Hula (Mendel University, Brno), A. Jelínek (Telč), R. Kostanjšek and M. Kuntner (University of Ljubljana, Ljubljana), N. Kovblyuk (Simferopol), T. Kronstedt (Museum of Natural History, Stockholm), L. Kubcová (Charles University, Prague), A. Kůrka (National Museum, Prague), Z. Majkus (University of Ostrava, Ostrava), G. Milledge (Australian Museum, Sydney), S. Nawai and J. Dunlop (Museum of Natural History, Humboldt University, Berlin), W. Nentwig (University of Bern, Bern), S. Polak (Notranjski Museum Postojna, Postojna), V. Růžička (Entomological Institute, České Budějovice), P. Saska (Research Institute of Crop Production, Prague), P. Špryňar (Prague), F. Štáhlavský (Charles University, Prague), J. Strejček (Prague), J. Svatoň (Martin), T. Szűts (Hungarian Natural History Museum, Budapest), S. Táborská-Rajová (Prague), K. Tajovský (České Budějovice), K. Thaler (Innsbruck), V. Thomka (Museum of Vihorlat Mts., Humenné), J. Waldock (Western Australian Museum, Perth), and E. Žďárková (Zákolany). P. Gajdoš and J. Svatoň provided help with localities in Slovakia, R. Bosmans provided

help with localities in Algeria. Ch. Hervé provided help with old literature. We wish to acknowledge the valuable comments of M.S. Harvey, M. Rix, and anonymous reviewers. This research was supported by a grant no. 0002700603 of the Ministry of Agriculture of the Czech Republic, no. 103/2003 of the Charles University, and no. 1886/2004 of the Czech Fund for Development of Higher Education. SP was supported by grant no. 0021622416 and JK by grant no. 0021620828 from the Ministry of Education, Youth, and Sports of the Czech Republic.

LITERATURE CITED

- Arnedo, M.A., P. Oromí & C. Ribera. 2000. Systematics of the genus *Dysdera* (Araneae, Dysderidae) in the eastern Canary Islands. *Journal of Arachnology* 28:261–292.
- Becker, L. 1896. Les arachnides de Belgique. *Annales du Musée Royal d'Histoire Naturelle de Belgique* 12:1–378.
- Benavente, R. 1982. Holocentric chromosomes of arachnids: presence of kinetochore plates during meiotic divisions. *Genetica* 59:23–27.
- Benavente, R. & R. Wettstein. 1980. Ultrastructural characterization of the sex chromosomes during spermatogenesis of spiders having holocentric chromosomes and long diffuse stage. *Chromosoma* 77:69–82.
- Blackwall, J. 1864a. A History of the Spiders of Great Britain and Ireland. Part II. Ray Society, London. Pp. 175–384.
- Blackwall, J. 1864b. Notice of spiders, indigenous to the Salvages, received from the Barao do Castello de Paiva. *Annals and Magazine of Natural History* 14(3):174–180.
- Blandenier, G. & P.-A. Fürst. 1998. Ballooning spiders caught by a suction trap in an agricultural landscape in Switzerland. Pp. 177–186. *In* Proceedings of the 17th European Colloquium of Arachnology, Edinburgh 1997. (P.A. Selden, ed.). British Arachnological Society, Burnham Beeches, Buckinghamshire, UK.
- Bösenberg, W. & E. Strand. 1906. Japanische Spinnen. *Abhandlungen der Senckenbergischen Naturforschenden Gesellschaft* 30:93–422.
- Braendegaard, J. 1966. Edderkopper: Eller Spindlere I. *Danmarks Fauna* 72:1–224.
- Buchar, J. & V. Růžicka. 2002. Catalogue of Spiders of the Czech Republic. Peres, Prague. 349 pp.
- Canestrini, G. 1868. Nuovi aracnidi italiani. *Annuario della Società dei Naturalisti di Modena* 3:190–206.
- Canestrini, G. & P. Pavesi. 1868. Araneidi italiani. *Atti della Società Italiana di Scienze Naturali* 11:738–872.
- Canestrini, G. & P. Pavesi. 1870. Catalogo sistematico degli Araneidi italiani. *Archivio per la Zoologia l'Anatomia e la Fisiologia Bologna* 2:60–64.
- Caporiacco di, L. 1937. Un manipolo di araneidi della Tripolitania costiera. *Monitore Zoologico Italiano* 48:57–60.
- Charitonov, D.E. 1956. Obzor paukov semeistva Dysderidae fauny SSSR [Overview of spiders of the family Dysderidae of the USSR]. *Uchenie Zapiski Molotovskogo gosudarstvennogo Universiteta* 10:17–39. [in Russian]
- Chytrý, M., T. Kučera, & M. Kočí (eds.). 2001. Katalog biotopů České republiky [Catalogue of biotopes of the Czech Republic]. Agentura Ochrany Přírody a Krajiny, Prague. 304 pp. [in Czech]
- Chyzer, C. & W. Kulczyński. 1897. Araneae hungariae. Tomi II – di pars prior. Hungarian Academy of Science, Budapest. Pp. 151–366.
- Comstock, J.H. 1940. The Spider Book. Cornell University Press, Ithaca, New York. 727 pp.
- Cooke, J.A.L. 1965. A contribution to the biology of the British spiders belonging to the genus *Dysdera*. *Oikos* 16:20–25.
- Cooke, J.A.L. 1966. Synopsis of the structure and function of the genitalia in *Dysdera crocata* (Araneae, Dysderidae). *Senckenbergiana Biologica* 47:35–43.
- Cooke, J.A.L. 1967. Factors affecting the distribution of some spiders of the genus *Dysdera* (Araneae, Dysderidae). *Entomologist's Monthly Magazine* 103:221–225.
- Cooke, J.A.L. 1972. A new genus and species of oonopid spider from Colombia with a curious method of embolus protection. *Bulletin of the British Arachnological Society* 2:90–92.
- Dahl, F. 1883. Analytische Bearbeitung der Spinnen Norddeutschlands mit einer anatomisch-biologischen Einleitung. *Schriften des Naturwissenschaftlichen Vereins für Schleswig-Holstein* 5:13–88.
- Deeleman-Reinhold, C.L. 1986. *Dysdera hungarica* Kulczyński – a case of parthenogenesis? Pp. 25–31. *In* Actas X Congreso Internacional de Aracnología Jaca/España. (J.A. Barrientos, ed.). Impreso por Imprenta Juvenil, Barcelona, Spain.
- Deeleman-Reinhold, C.L. & P.R. Deeleman. 1988. Revision des Dysderinae (Araneae, Dysderidae), les especes mediterraneennes occidentales exceptees. *Tijdschrift voor Entomologie* 131:141–269.
- Deltshev, C.C., B.P.M. Čurčić & G.A. Blagoev. 2003. The Spiders of Serbia. Committee for Karst and Speleology – Serbian Academy of Sciences and Arts, Institute of Zoology – Bulgarian Academy of Sciences, Belgrade, Sofia. 834 pp.
- Díaz, M. & F.A. Sáez. 1966. Karyotypes of South American Araneida. *Memórias Instituto Butantán Comemorativo* 33:153–154.

- Dippenaar-Schoeman, A.S. & R. Jocqué. 1997. African Spiders. An Identification Manual. Agricultural Research Council, Pretoria, South Africa. 392 pp.
- Doblika, K. 1853. Beitrag zur Monographie des Spinnengeschlechtes *Dysdera*. Verhandlungen der k. k. zoologisch-botanischen Gesellschaft in Wien 3(Abh.):115–124.
- Drensky, P. 1938. Die Spinnenfauna Bulgariens. II. Unterordnung Arachnomorphae, I Gruppe Tetrastica, Familien: Filistatidae, Dysderidae und Oonopidae. Mitteilungen aus den Königlichen Naturwissenschaftlichen Instituten in Sofia 11:81–106.
- Dresco, E. 1973. Araignées de Bretagne. Le genre *Dysdera* (fam. Dysderidae). Bulletin de la Société Scientifique de Bretagne 47:245–256.
- Dunin, P.M. 1992. The spider family Dysderidae of the Caucasian fauna (Arachnida Aranei Haplogynae). Arthropoda Selecta 1(3):35–76.
- Emerton, J.H. 1890. New England spiders of the families Drassidae, Agelenidae, and Dysderidae. Transactions of the Connecticut Academy of the Arts and Sciences 8:166–206.
- Emerton, J.H. 1902. The Common Spiders of the United States. The Athenaeum Press, Boston. 225 pp.
- Forster, R.R. & N.I. Platnick. 1985. A review of the austral spider family Orsolobidae (Arachnida, Araneae), with notes on the superfamily Dysderoidea. Bulletin of the American Museum of Natural History 181:1–230.
- Gajdoš, P., J. Svatoň & K. Sloboda. 1999. Catalogue of Slovakian Spiders. Ústav Krajinej Ekológie SAV, Bratislava. 337 pp.
- Gasparo, F. 2004. Descrizione di *Dysdera arganoi* n. sp. della Calabria meridionale (Araneae, Dysderidae). Fragmenta Entomologica 36:93–102.
- Grasshoff, M. 1959. *Dysdera*-Arten von Inseln der Mittelmeergebietes (Arach., Araneae). Senckenbergiana Biologica 40:209–220.
- Gruber, J. 1990. Fatherless spiders. Newsletter of the British Arachnological Society 58:3.
- Heimer, S. & W. Nentwig. 1991. Spinnen Mitteleuropas. Verlag Paul Parey, Hamburg, Germany. 543 pp.
- Hentz, N.M. 1842. Descriptions and figures of the araneides of the United States. Boston Journal of Natural History 4:54–57, 223–231.
- Herman, O. 1879. Magyarországi pók-faunája, 3. Budapest. 394 pp.
- International Commission on Zoological Nomenclature. 2007. International Code of Zoological Nomenclature. Fourth Edition. The International Trust for Zoological Nomenclature, The Natural History Museum, London. Online at <http://www.iczn.org/iczn/index.jsp>.
- Jacobs, D.H. 2004. The evolution of a neo-XY₁Y₂ sex chromosome system by autosome-sex chromosome fusion in *Dundocoris nodulicarinus* Jacobs (Heteroptera: Aradidae: Carventinae). Chromosome Research 12:175–191.
- Kaston, B.J. 1948. Spiders of Connecticut. Bulletin of the Connecticut State Geological and Natural History Survey 70:1–874.
- Keyserling, E. 1877. Amerikanische Spinnenarten aus den Familien der Pholcoidae, Scytodoidae und Dysderoidea. Abhandlungen der k. k. Zoologisch-Botanischen Gesellschaft in Wien 27:205–234.
- Koch, C. 1874. Beiträge zur Kenntniss der nassauischen Arachniden. I. Die Familien der Mithraides, Pholcides, Eresides, Dysderies und Mygalides. Jahrbüchern des nassauischen Vereins für Naturkunde 27–28:185–210.
- Koch, C.L. 1838. Die Arachniden. Vierter Band (pp. 109–144). Fünfter Band (pp. 1–124). C.H. Zeh'schen Buchhandlung, Nürnberg, Germany.
- Locket, G.H. & A.F. Millidge. 1951. British Spiders. Volume 1. Ray Society, London. 310 pp.
- Loksa, I. 1969. Araneae I. Fauna Hungariae 97:1–133.
- Mcheidze, T.S. 1997. [Spiders of Georgia: Systematics, Ecology, Zoogeographic Review]. Tbilisi University, Tbilisi. 390 pp. [in Georgian].
- Menge, A. 1872. Preussische Spinnen. V. Schriften der Naturforschung Gesellschaft in Danzig 2:297–326.
- Miller, F. 1971. Řád Pavouci – Araneida [Order Spiders – Araneida]. Pp. 51–306. In Klíč zvířeny ČSSR. IV [Key to the Fauna of Czechoslovakia. IV]. (M. Daniel & V. Černý, eds.). ČSAV, Praha. [in Czech]
- Moravec, J. (ed.). 1995. Rostlinná společenstva České republiky a jejich ohrožení. Severočeskou přírodou, addendum 1995:1–206. [in Czech]
- Nicolet, A.C. 1849. Aracnidos. In Historia física y política de Chile. (C. Gay, ed.). Zoologia 3:319–543.
- Nosek, A. 1905. Araneiden, Opilionen und Chernetiden. In Ergebnisse einer naturwissenschaftlichen Reise zum Erdschias-Dagh (Kleinasien). (A. Penher & E. Zederbauer, eds.). Annalen des k. k. naturhistorischen Hofmuseums Wien 20:114–154.
- Oltean, C. 1962. Contribution à la connaissance de la répartition des aranéides dans les régions de Bucarest et de Dobrogea. Studii si Cercetari de Biologie, Seria Biologie Animala 4:575–584.
- Pekár, S. & J. Král. 2001. A comparative study of the biology and karyotypes of two central European zodariid spiders (Araneae, Zodariidae). Journal of Arachnology 29:345–353.
- Pesarini, C. 2001. Sei nuove specie di Dysderidae d'Italia e di Grecia (Araneae). Atti della Società Italiana di Scienze Naturali, Museo Civico di Storia Naturale di Milano 141:291–301.
- Planet, L. 1905. Histoire Naturelle de la France. 14 partie, Araignées (Araignées, Chernetes, Scorpions, Opilions). Maison Émile Deyrolle, Paris. 341 pp.
- Platnick, N.I. 2007. The World Spider Catalog, version 7.5. American Museum of Natural History, New York. Online at <http://research.amnh.org/entomology/spiders/catalog/index.html>.

- Polenec, A. 1985. Pajki iz gornjega dela selske doline termofilni bukov gozd nad zalim logom, 650 m. *Loski Razgledi* 32:98–107.
- Rainbow, W.J. 1900. Descriptions of some new Araneidae of New South Wales. No. 9. Proceedings of the Linnean Society of New South Wales 25:483–494.
- Reimoser, E. 1919. Katalog der echten Spinnen (Araneae) des Palarktischen Gebietes. Abhandlungen der zool.-botan. Gesellschaft in Wien 10(2):1–280.
- Řezáč, M. & V. Bryja. 2002. *Dysdera hungarica* Kulczyński 1897 (Araneae, Dysderidae), an interesting new species for the arachnofauna of the Czech Republic. *Acta Musei Moraviae, Scientiae Biologicae* 87:75–81.
- Ribera, C., M.A. Ferrández & J.A. Pérez. 1989. Los Dysderidae (Arachnida, Araneae) Cavernícolas de la Peninsula Iberica. Pp. 241–244. In 9th International Congress of Arachnology, Panama. (W.G. Eberhard, Y.D. Lubin & B. Robinson, eds.). Smithsonian Institution Press, Balboa (Panama).
- Roberts, M.J. 1985. The Spiders of Great Britain and Ireland. Volume 1: Atypidae to Theridiosomatidae. Harley Books, Colchester, UK. 229 pp.
- Roberts, M.J. 1995. The Spiders of Britain and Northern Europe. HarperCollins Publishers, London. 383 pp.
- Roberts, M.J. 1998. Spinnengids. Tirion, Baarn (Netherlands). 397 pp.
- Rodríguez Gil, S.G., L.M. Mola, A.G. Papeschi & C.L. Scioscia. 2002. Cytogenetic heterogeneity in common haplogyne spiders from Argentina (Arachnida, Araneae). *Journal of Arachnology* 30:47–56.
- Roewer, C.F. 1928a. Araneae, Echte oder Webspinnen, III. Band, VI. In *Die Tierwelt Mitteleuropas*. (P. Brohmer, P. Ehrmann & G. Ulmer, eds.). Quelle & Meyer, Leipzig. 144 pp.
- Roewer, C.F. 1928b. Araneae. In *Zoologische Streifzüge in Attika, Morea, und besonders auf der Insel Kreta*. II. Abhandlungen Herausgegeben vom Naturwissenschaftlichen Verein zu Bremen 27:92–123.
- Romano, R. & M.A. Ferrández. 1983. *Dysdera scabricula* Simon 1882, nueva especie para la Peninsula Ibérica con notas acerca de los dysderidos de la provincia de Navarra. Vol. 2. Pp. 685–697. In *Actas I Congreso Ibérico de Entomología*, León. (Anonymous, ed.). Asociación Española de Entomología, León.
- Schmidt, G.E.W. 1982. Zur Spinnenfauna von La Palma. *Zoologische Beiträge* 27:393–414.
- Schult, J. 1983. Taster haplogyner Spinnen unter phylogenetischem Aspekt (Arachnida: Araneae). *Verhandlungen des Naturwissenschaftlichen Vereins in Hamburg* 26:69–84.
- Scopoli, J.A. 1763. *Entomologia carniolica, exhibens insecta carniolae indigena et distributa in ordines, genera, species, varietates. Methodo Linnaeana*, Vienna. 420 pp.
- Simon, E. 1910. Catalogue raisonné des arachnides du nord de l'Afrique (Ire partie). *Annales de la Société Entomologique de France* 79:265–332.
- Simon, E. 1914. Les Arachnides de France. Le Synopsis Général et le Catalogue des Espèces Françaises de l'Ordre des Araneae; Tome sixième, première partie. *Encyclopédie Roret*, L. Mulo, Paris. 308 pp.
- Song, D.X., M.S. Zhu & J. Chen. 1999. The Spiders of China. Hebei Science and Technology Publishing House, Shijiazhuang, China. 640 pp.
- Suomalainen, E., A. Saura & J. Lokki. 1987. Cytology and Evolution in Parthenogenesis. CRC Press, Boca Raton, Florida. 232 pp.
- Taczanowski, L. 1874. Les Araneides de la Guyane française. *Horae Societatis Entomologicae Rossicae* 10:56–115.
- Thaler, K. & B. Knoflach. 2002. Zur Faunistik der Spinnen (Araneae) von Österreich: Atypidae, Haplogynae, Eresidae, Zodariidae, Mimetidae. *Linzer Biologische Beiträge* 34:413–444.
- Thomka, V. 1997. Pavúky (Araneae) v prírodnej rezervácii Viniansky hradný vrch (Slovensko) [Spiders (Araneae) of the Nature Reserve Viniansky hradný vrch (Slovakia)]. *Klapalekiana* 33:103–113. [in Slovak, with German summary and English abstract]
- Thorell, T. 1873. Remarks on Synonyms of European Spiders. Part IV. C. J. Lundström, Uppsala, Sweden. Pp. 375–645.
- Tyschenko, V.P. 1971. *Opredelitel' paukov evropejskoj casti SSSR* [Determination key of spiders of the European part of the USSR]. Nauka, Leningrad. 281 pp. [in Russian]
- Walckenaer, C.A. 1837. *Histoire naturelle des insectes. Aptères*. Librairie Encyclopédique de Roret, Paris. 682 pp.
- Wiehle, H. 1953. Spinnentiere oder Arachnoidea (Araneae) IX: Orthognatha – Cribellatae – Haplogynae – Entelegynae (Pholcidae, Zodariidae, Oxyopidae, Mimetidae, Nesticidae). Pp. 1–150. In *Die Tierwelt Deutschlands und der Angrenzenden Meeresteile nach ihren Merkmalen und nach ihrer Lebensweise*. 42. Teil. (F. Dahl, ed.). Veb Gustav Fischer Verlag, Jena, Germany.
- Wunderlich, J. 1992. Die Spinnen-Fauna der Makaronesischen Inseln: Taxonomie, Ökologie, Biogeographie und Evolution. *Beiträge zur Araneologie* 1:1–619.
- Wunderlich, J. 1995. Zu Ökologie, Biogeographie, Evolution und Taxonomie einiger Spinnen der Makaronesischen Inseln (Arachnida: Araneae). *Beiträge zur Araneologie* 4:385–439.
- Yoshikura, M. 1987. *The Biology of Spiders*. Japan Scientific Societies Press, Tokyo. 613 pp.